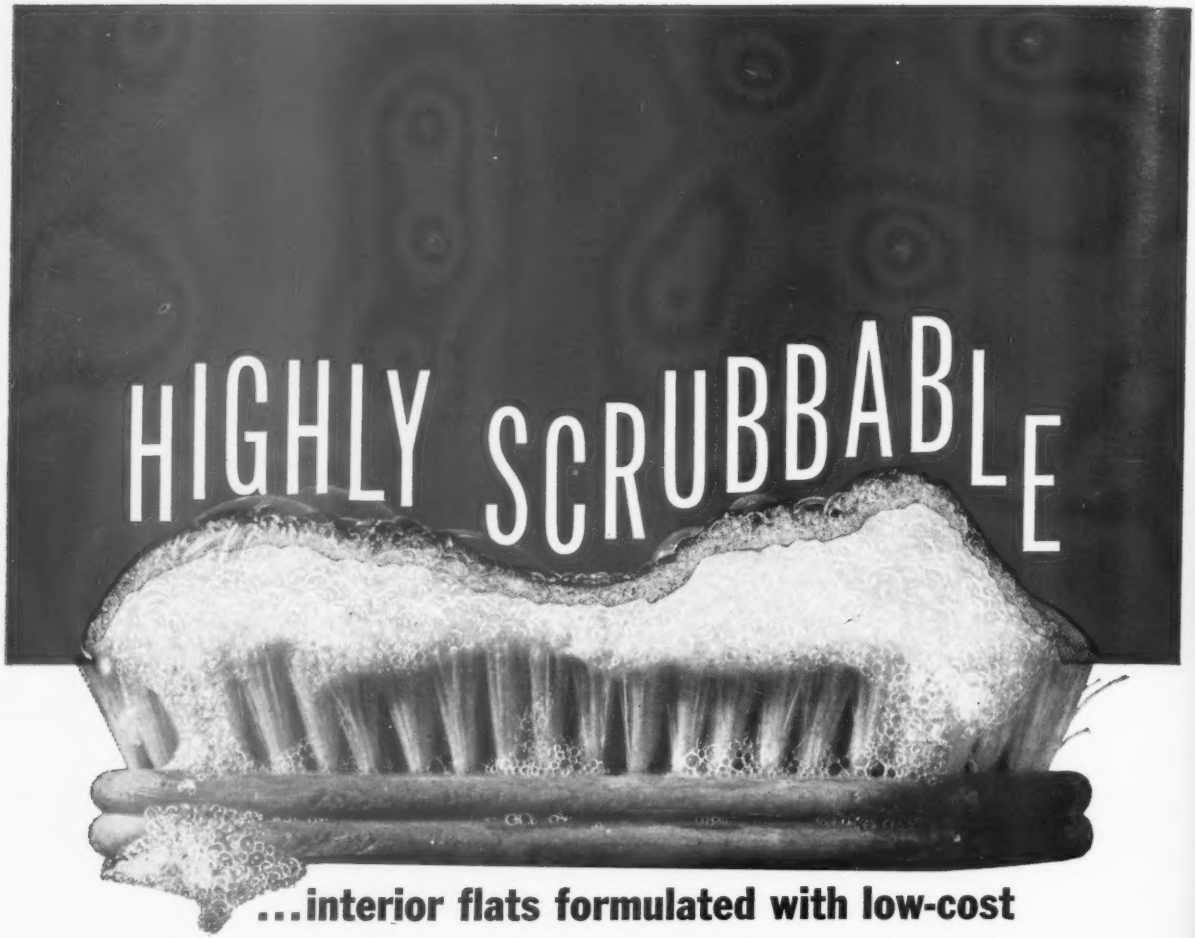

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RCI 9307 WALLPOL

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In fact, *interior* flats compounded with 9307 WALLPOL are comparable in every respect to those employing copolymer emulsions – with the advantage of a savings in raw material cost of approximately 5¢ per gallon!

Doesn't it make good sense to take advantage of the savings possible using RCI 9307 WALLPOL in your indoor flat paints? You can save too, on combined orders of RCI resins, chemicals and colors to earn applicable quantity prices. Write to Reichhold for full details about 9307 WALLPOL's place in *your* paint production.

FOR EXTERIOR FINISHES,

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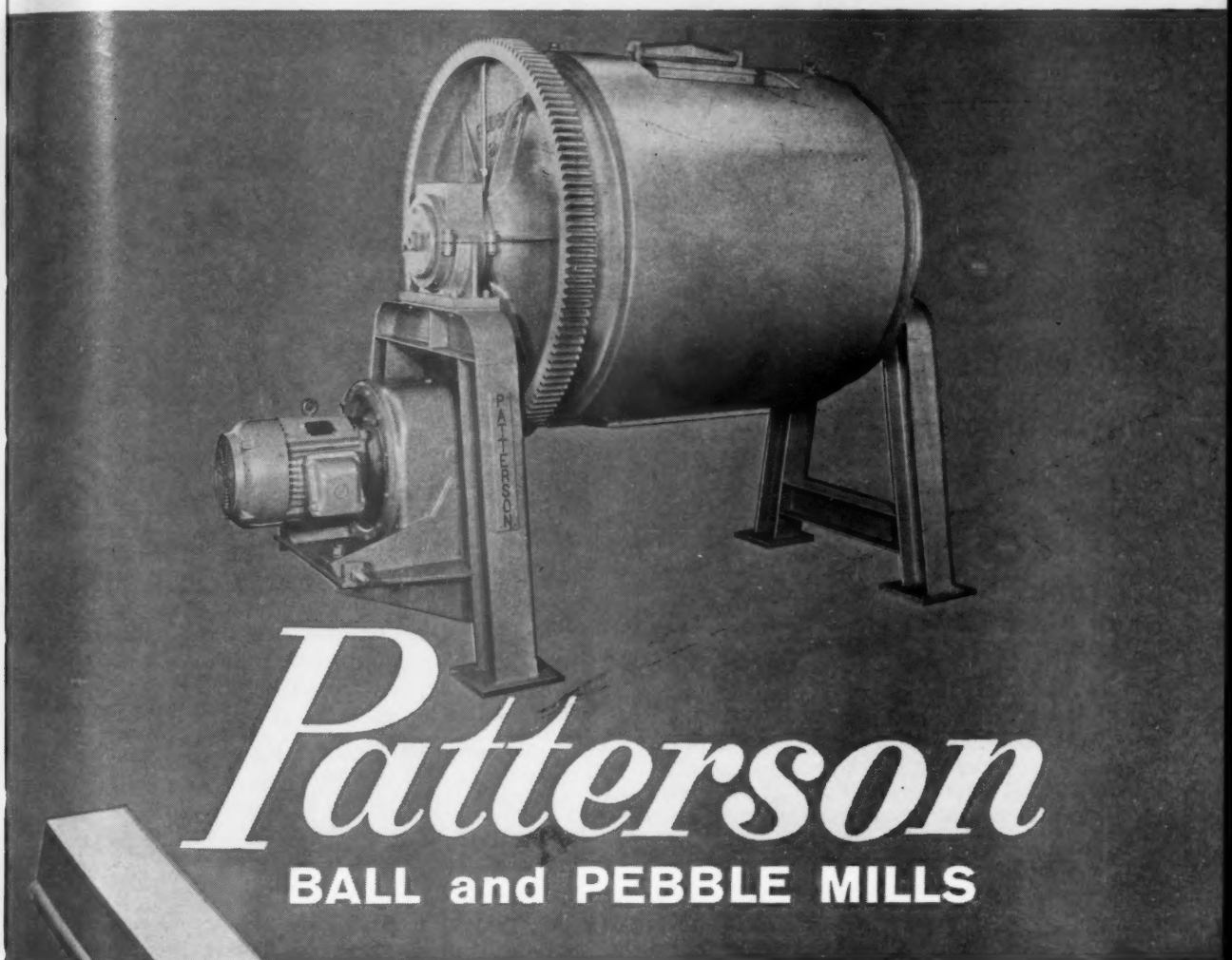

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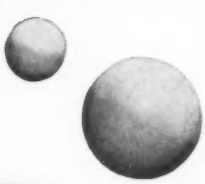

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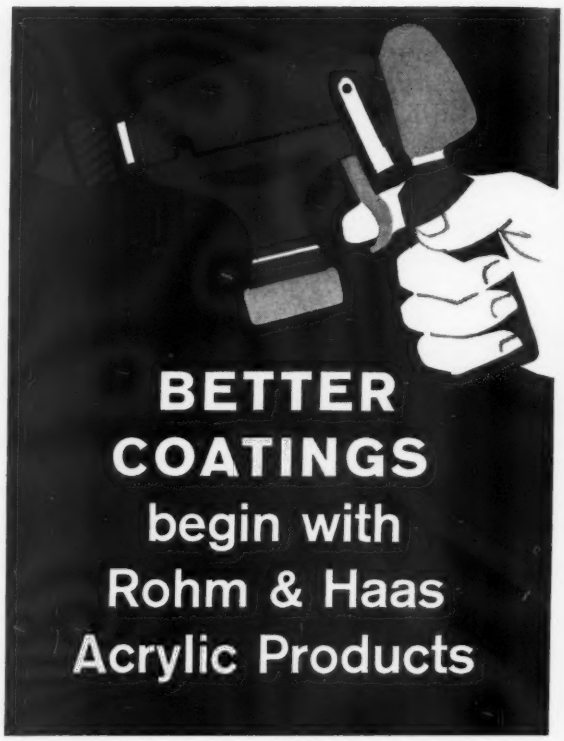

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OCTOBER 1960

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOLUME 50
NO. 11

PVP Golden Anniversary

NEXT ISSUE

The use of methyl and vinyl pyrrolidone as pigment dispersing aids will be featured in our November issue. Their properties and how these materials can be used effectively in dispersing inorganic and organic pigments will be discussed in detail.

PAINT and VARNISH PRODUCTION is published monthly except semi-monthly in March at Easton, Pa., by Powell Magazines, Inc., John Powell, president; Ira P. MacNair, vice-president and treasurer; Alan P. Danforth, vice-president; Alice L. Lynch, secretary. Entered as second class matter at Post Office at Easton, Pa., Jan. 30th, 1952, under the Act of March 3, 1879. SUBSCRIPTION RATES POSTPAID: *United States and Canada*, 1 year $4.00; 2 years $7.00. *Mexico and Pan-American Countries*, 1 year $5.00; 2 years $8.00. All other countries, 1 year $8.00; 2 years $15.00. Remit cash in advance, with order, by bankers draft on New York funds. SINGLE COPIES: *Current issue:* $0.50; *all back numbers:* $1.00. Convention issue: $1.00. Review and Buyers' Guide: $5.00. Bound volumes: $15.00 per vol. when available. We cannot guarantee to supply back numbers and claims for missing numbers cannot be granted if received more than 60 days after date of mailing. Subscribers should promptly notify circulation department of any change in address, giving both old and new addresses and by sending address label. EDITORIAL AND EXECUTIVE OFFICES: 855 Avenue of the Americas, New York 1, N. Y. BRyant 9-0497. Printed in U. S. A.

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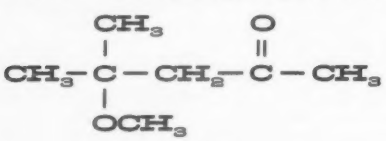

Keto-ether

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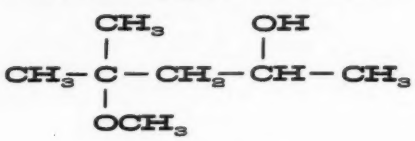

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for use in acrylic, vinyl, and nitrocellulose lacquers

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PENT-OXONE	PHYSICAL PROPERTIES	PENT-OXOL
147.0-163.0°C.	ASTM BOILING RANGE	163.8-167.0°C.
141°F.	FLASH POINT	140°F.

PENT-OXONE and PENT-OXOL show promise as high boilers for epoxy coatings, thermosetting acrylic formulations, vinyl-acrylics, and other surface coating applications. They should find use as solvents in a wide range of uses not directly connected to the surface coating industry.

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SHELL

EDITORIAL COMMENT

Important Meetings

THE two biggest paint conventions are upon us. This year the National Paint, Varnish and Lacquer Association and the Federation of Societies for Paint Technology are meeting in Chicago, October 27-29th and October 31-November 2nd respectively.

The respective programs of these two groups will be of interest to all segments of the coatings industry. As in the past, the National Association's meeting will deal with managerial problems whereas the Federation will concentrate on technology and production.

This year is no exception to the array of speakers, forums, conferences, workshops, etc., that National Association has lined up for its 73rd annual meeting. Keynoting the meeting will be H. C. McClellan, president of Old Colony Paint and Chemical Company. The subject of his talk will be "Moscow Report."

Of particular interest will be a highly important conference on the subject of "Technical Manpower-How to Get, How to Keep It," scheduled for the second day's general session. Presentations will be made on technical personnel employment and techniques used by manufacturers in the industry.

Rounding out the final session on Saturday will be a talk by Leo Cherne, executive director of the Research Institute of America. He will discuss, "The Donkey — The Elephant — And Your Future."

The Federation will present a program reviewing the status of developments in paint technology and examining new results of research.

An annual highlight of the Federation's meeting is the Joseph J. Mattiello Memorial Lecture. This year's lecture will be given by Prof. Henry F. Payne of the University of Florida. "The Philosophy of Coatings" will be the subject of his lecture, which will be a discussion of basic principles of coating binders, recent polymer developments and their future possibilities in coating materials.

E. Edgar Fogle, president of Union Carbide Chemicals Co. will present the Keynote Address.

An innovation of this year's Federation meeting will be two informal round table production forums dealing with (1) Straining, Filling, Labeling and Casing and (2) Raw and Finished Materials Handling. In order that these round table discussions will be as productive as possible, a limit to an attendance of 25 has been set for each session.

Two interesting panel discussions, Rheology and Metal Protective Maintenance Painting are included in the program. In addition several Society, Roon Competition and Invited papers will be presented.

One of the biggest attractions will be the 1960 Paint Industries' Show, consisting of 109 exhibitors who will occupy more than 18,000 square feet of exhibit space. A highlight of this show is the Lacquer Information Center which has been exhibiting for the tenth successive year. The exhibit, presented through the cooperative efforts of suppliers of materials for lacquer, will depict the latest developments in lacquer technology, formulation and application.

The 1960 Paint Industries' show bids fair to attract a large number of paint technologists and production men who are looking for ideas, material, and equipment to help them do their jobs better. Since the exhibits will be manned by technical representatives, this show presents a unique opportunity for one to discuss the most recent advances taking place in raw materials and equipment. Furthermore, the show serves as a focal point where the technical men can look for answers to their problems. With some 109 firms exhibiting, paint technicians will have plenty to see and talk about. If your time is limited, it might be a good idea to plan your trip through the exhibit halls so that you will be sure of seeing those exhibits which interest you most. However, the show will be open 28 hours during the four-day period (October 29-November 2), which will allow enough flexibility in planning your schedule.

Remember the dates, October 26-November 2nd for the two most important meetings of the year. See you in Chicago.

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PAINT AND VARNISH PRODUCTION

Serving Administration and Technical-Production Management of Coatings Manufacturing Plants

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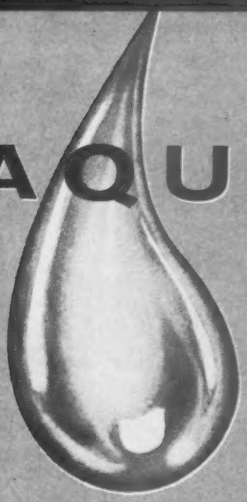

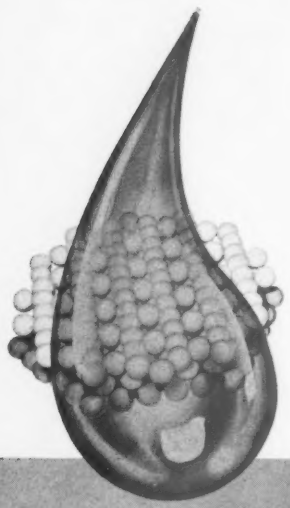

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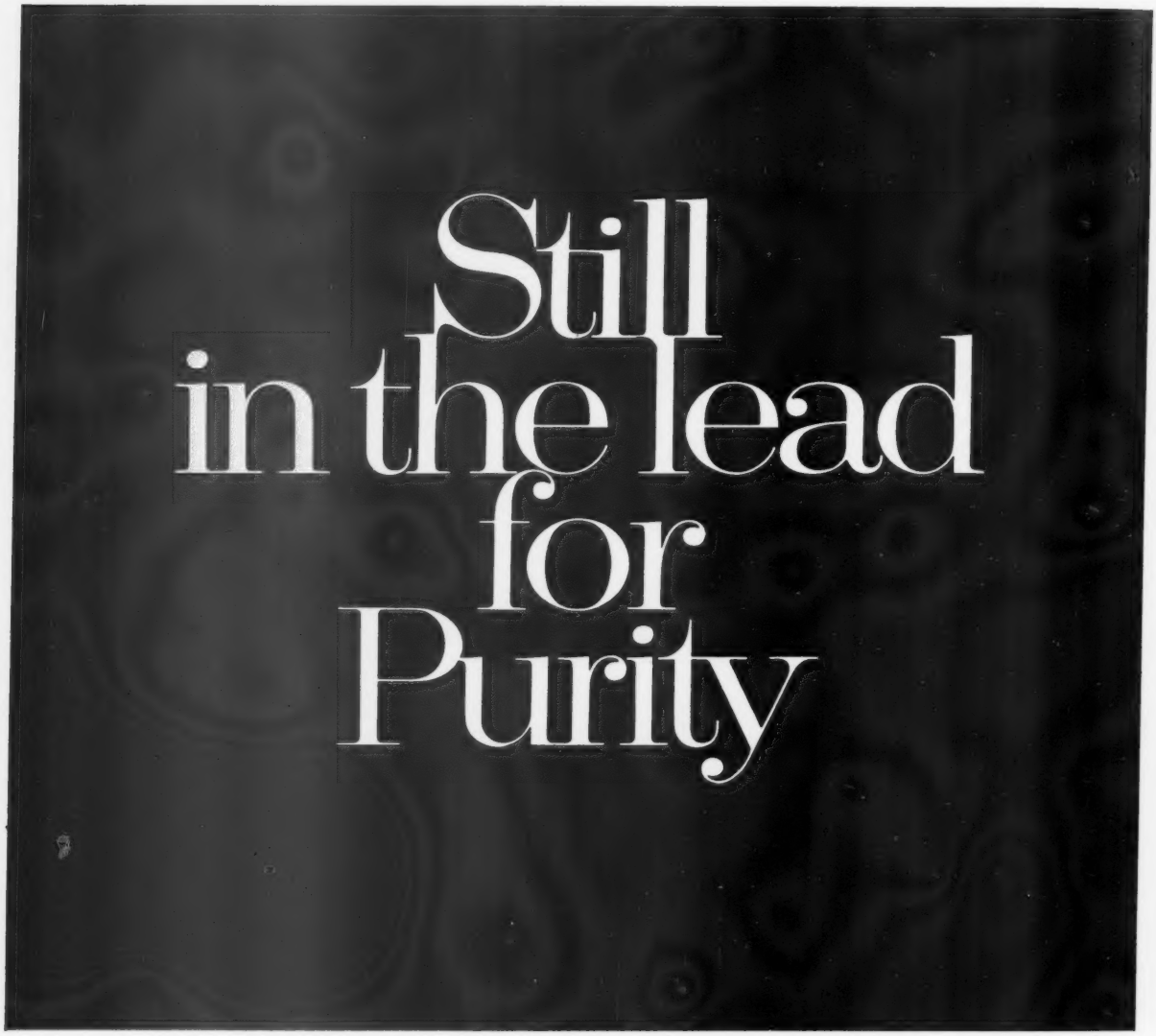

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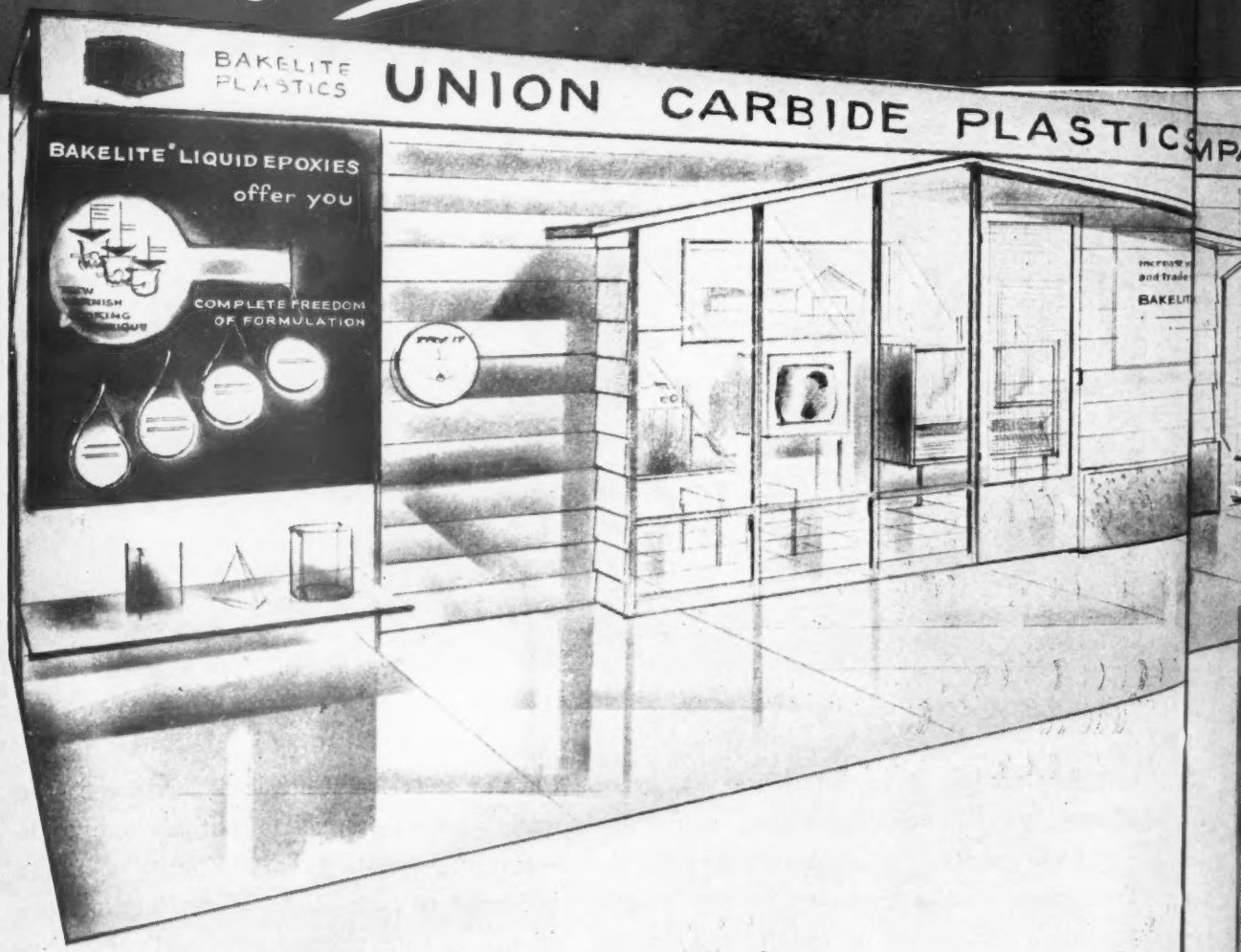

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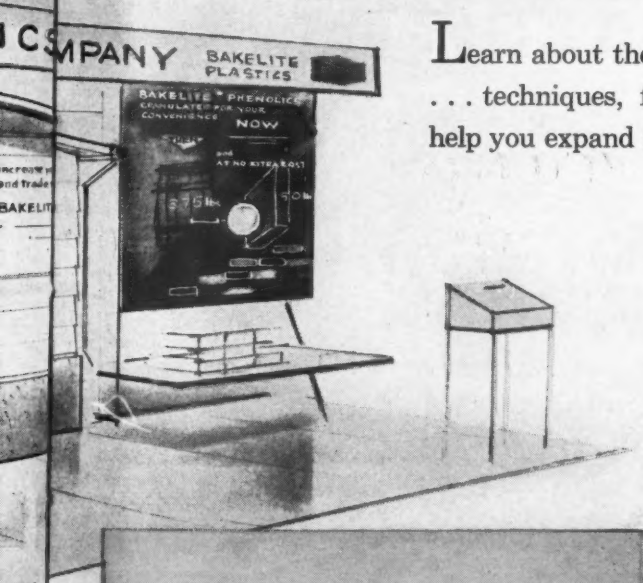

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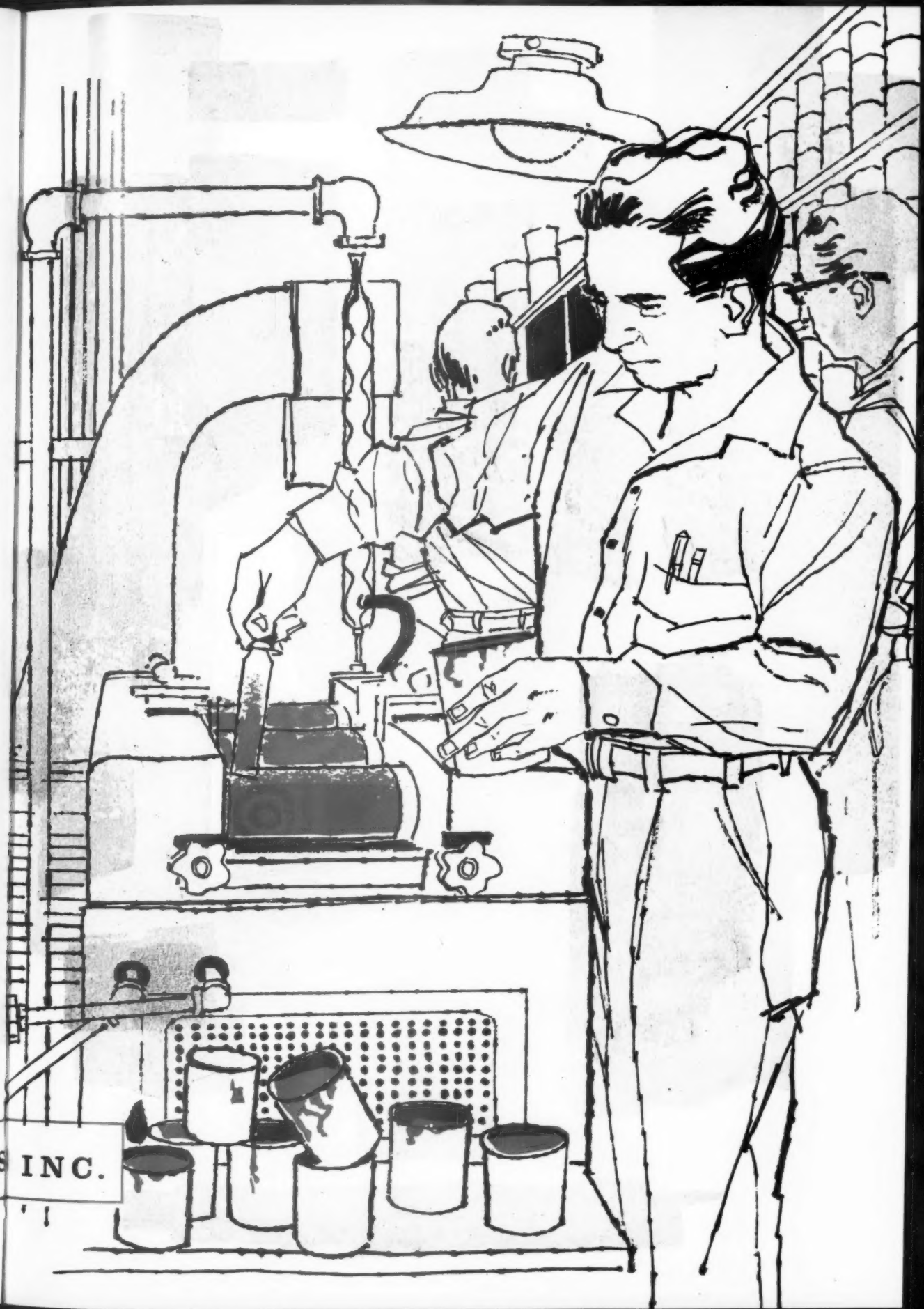

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W. Ronald Benson, Inc.
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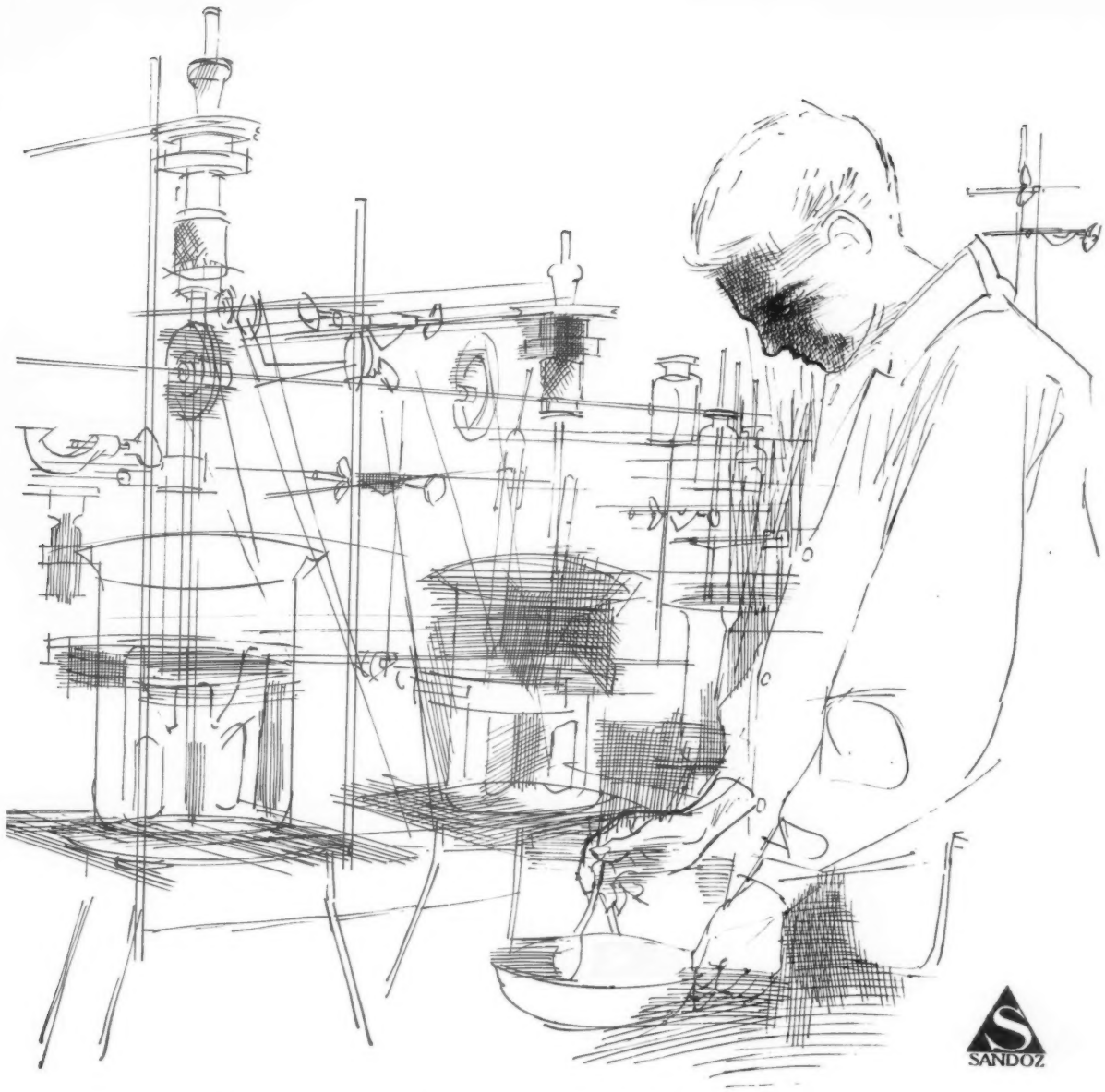


Graphtol Yellow 4335-O

BENZIDINE-ANISIDIDE TONER

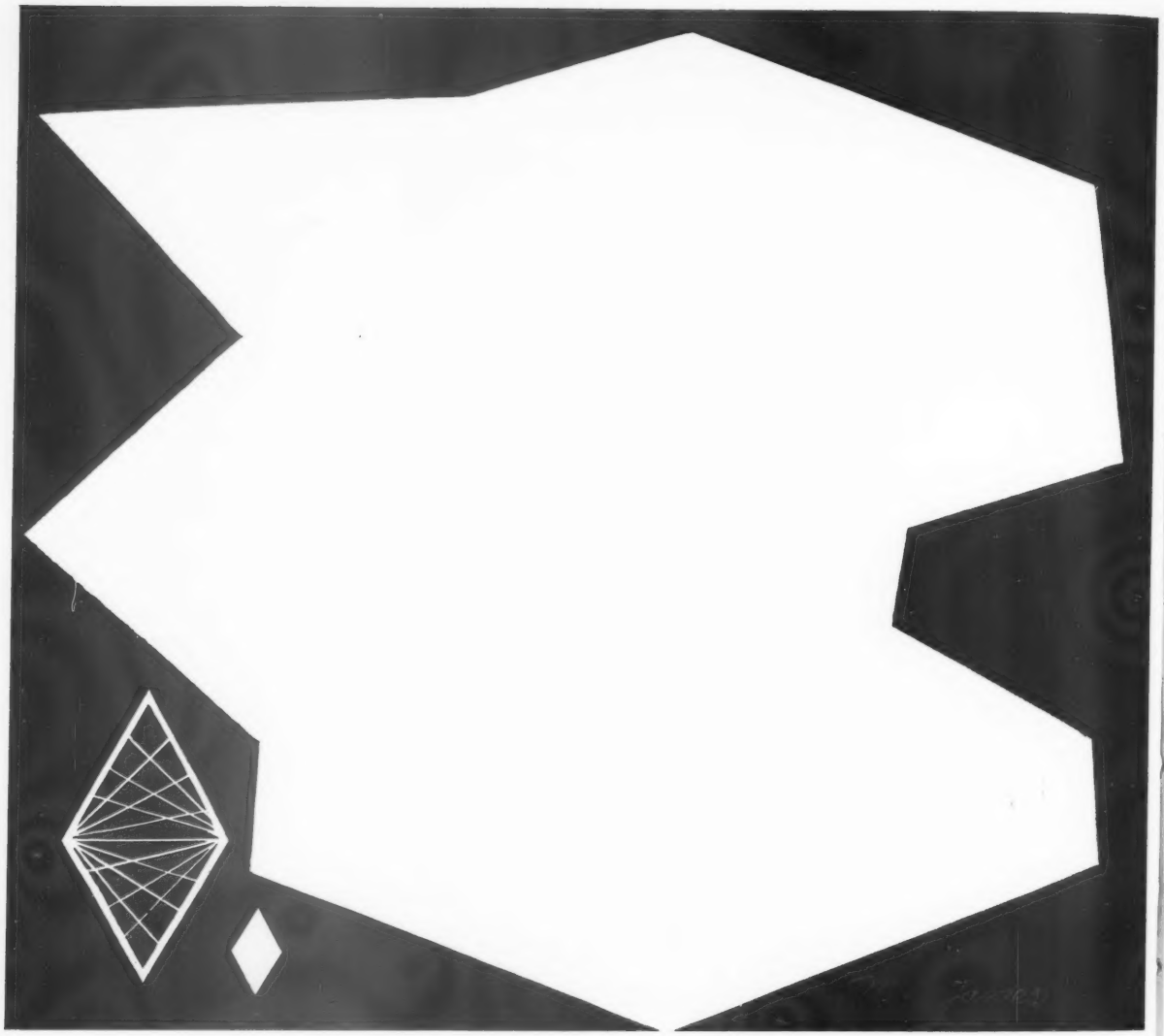
General Characteristics

Transparency	Excellent
Strength	Excellent
Heat Stability	
72 hours at 460°F	Excellent
Light Fastness (Masstone)	Good
Soap and Alkali Resistance	Excellent
Acid Resistance	Excellent
Alcohol Bleed	None
Hydrocarbon Solvent Bleed	Bleeds
Lacquer Solvent Bleed	Bleeds

GRAPHTOL YELLOW 4335-O is a green-shade, transparent, heat resistant pigment that is recommended for use in

a) Non-toxic toy enamels
b) Gold coatings with aluminum or pearl essence pigments
c) Light-fast wood stains
d) Heat resistant silicone coatings
e) Industrial baking enamels requiring moderate light fastness
f) Transparent coatings for aluminum and plastics
g) Alkali, acid and soap-resistant architectural finishes

FOR detailed information and a color showing, call or write SANDOZ, INC., Organic Pigments Division, 61 Van Dam St., New York 13, N. Y. (ALgonquin 5-1700). Pacific Coast: Martin, Hoyt & Milne, Los Angeles, San Francisco.



PRINTED WITH GRAPHTOL YELLOW 4335-0

see Sandoz

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ORGANIC PIGMENTS DIVISION
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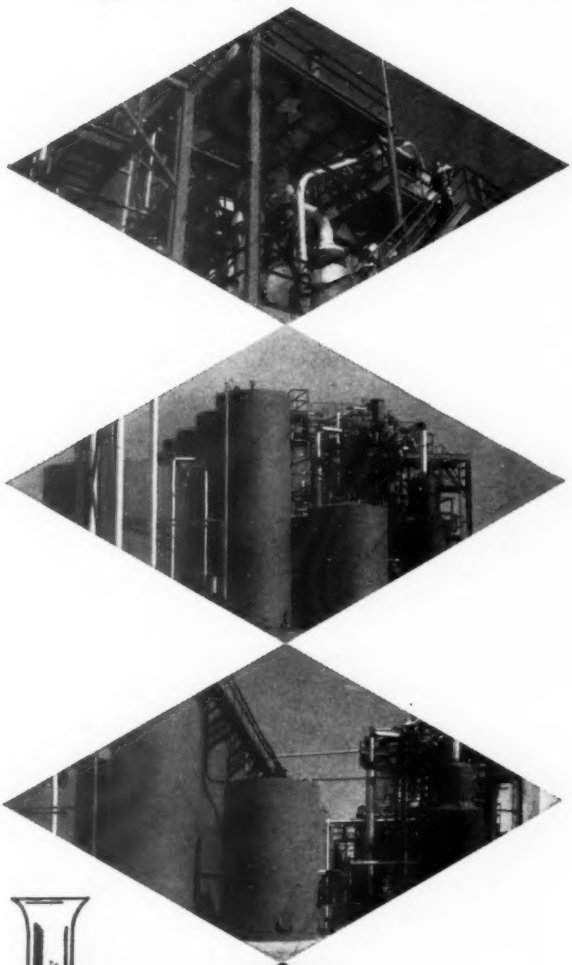
SANDOZ, INC. PIGMENT DIV. 61 VAN DAM ST. NEW YORK CITY MARTIN, HOYT & MILNE LOS ANGELES SAN FRANCISCO

Stepan Methyl Esters

For Alkyd Baking Enamels



The new Stepan plant at Millsdale, Illinois (near Joliet), includes a high capacity methyl esters production unit. This unit, of the very latest design, is now producing a wide range of methyl esters from coconut oil of high purity and excellent uniformity. These products, as intermediates, offer you interesting possibilities for improving your product or products.

We suggest you consider methyl esters wherever fatty acids are used. In most cases the methyl esters are more reactive and offer cost savings. Further, methyl esters are considerably less corrosive than the corresponding fatty acids. Many reactions involving methyl esters can be run in plain steel, eliminating the need for costly storage tanks and reactors.

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STEPAN CHEMICAL COMPANY
Edens & Winnetka • Northfield, Illinois **PVP-10**

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the versatile petroleum resin

Easy to use Piccopale is a neutral, low cost petroleum hydrocarbon resin. Completely polymerized, Piccopale is non-reactive and uniform, has wide compatibility, and is soluble in aromatics and low solvency naphthas.

Piccopale offers new approaches and economic advantages to compounders in many fields that demand alkali, acid, and water resistance.

Piccopale is readily available from strategically placed warehouses and in large quantity from its production points in melting points 70°C through 110°C (B & R) in molten, solid, flaked, solution and emulsion form.

Don't forget specific gravity:
Rosin @ 20°C—1.087
Piccopale @ 20°C—0.975

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PERFECT FOR LATEX PAINTS

Makon 10 is a nonyl phenoxy polyoxyethylene ethanol offering excellent detergency, foaming, dispersing, emulsifying and solubilizing action. It will not hydrolyze in aqueous solutions of alkalis or acids. It can be used with anionic, cationic or other non-ionic agents. Makon 10 is effective in hard or soft water, as it does not form salts with metallic ions and is also unaffected by oxidizing or reducing agents.

STEPAN makon 10

SPECIFICATIONS

Physical State:	Clear viscous liquid
Color:	Pale yellow to colorless
Cloud Point of 1% Solution in Water:	52°—56°C
pH (1% solution):	Neutral
Solidification Point (°C):	4°
Flash Point (°C):	290°
Fire Point (°C):	330°
Density:	8.85 lbs. per gallon
Specific Gravity (25°C):	1.06

Send Coupon for Further Information and Sample

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Edens & Winnetka, Northfield, Illinois
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America's Most Complete Line of Surfactants—Make Stepan your "SHQ" (surfactant headquarters)

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On the formulation tightrope?

Don't be the fall guy. Surefooted paint men know that, when they use a Baker paint additive in their formulations, rheological properties are under control . . . proper balance assured . . . pigments suspended . . . sag eliminated. Baker additives take the chance out of formulating, produce batches that consistently please manufacturer and customer alike.

THIXCIN R®. . . best of all for *selling the customer* on the appearance of your paint in the can and its performance on the job.

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These time-proved additives impart the anti-sag and flow control, pigment suspension, smooth brushability, controlled penetration, and can stability that insure optimum paint performance. Ask your Baker man today for the full story on THIXCIN R and M-P-A and, most important, their use in *your* formulation. Baker plants at Bayonne and Los Angeles, offices and warehouses in principal cities.

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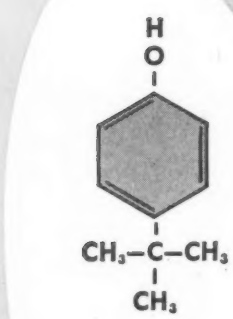
T7784

for Better Varnishes



p-tert-Butylphenol-formaldehyde resins impart rapid drying properties to varnishes. In addition, these resins also provide improved hardness and durability.

p-tert-Butylphenol

NOW AVAILABLE *IN VOLUME* FROM A CENTRALLY LOCATED SOURCE

Now in commercial production at Stepan's new Millsdale, Illinois plant (near Joliet) is p-tert-Butylphenol. This new Stepan product . . . one of a series of Stepan substituted phenols . . . can be supplied flaked or as a concentrated solution in caustic. Bulk shipments of the molten Butylphenol can also be made where required. There are a number of interesting commercial and potential uses for p-tert-Butylphenol, and we would be pleased to send you samples for your evaluation.

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Please send me bulletin on p-tert-Butylphenol and working sample.

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Firm _____

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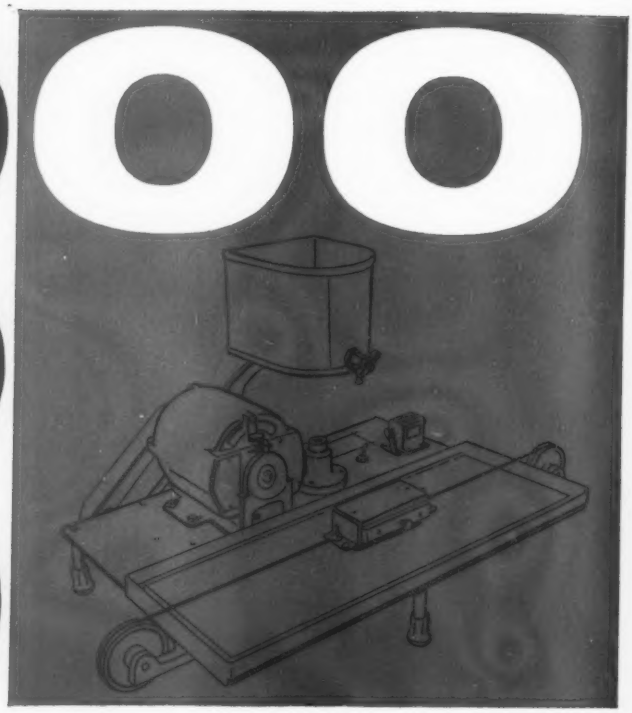
City _____ Zone _____ State _____

4 GARDNER SCRUBS

4000

without film failure



with less than $1 RMC paints based on GELVA TS-31

Repeated tests of interior paints based on GELVA TS-31 have revealed a scrubbability on a Gardner washability machine of over 4,000 cycles without film failure. What's more, this impressive performance was recorded in spite of the use of a one-half percent strong detergent solution instead of the usual soap solution. Here's another convincing proof that GELVA TS-31 makes possible high quality paints at a low cost—under $1 per gallon RMC.

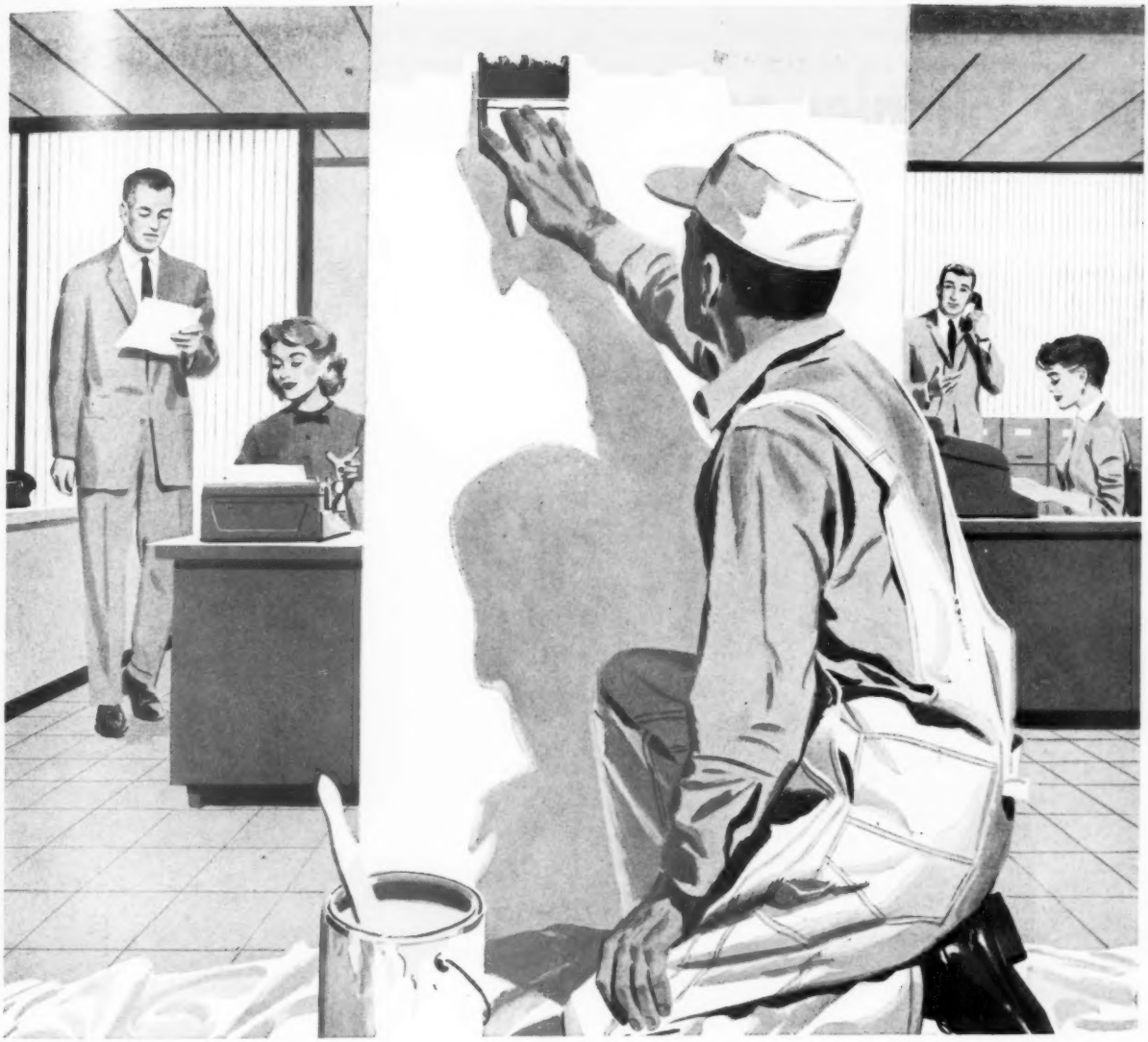
High PVC paints based on GELVA TS-31 are in commercial use and have been proven superior in hide, leveling, color acceptance, color uniformity, brushability and other properties. With Shawinigan's GELVA TS-31, as with no other emulsion, you can produce low cost, high quality polyvinyl acetate interior paints suitable for do-it-yourself and contractor lines.

The development of GELVA TS-31 emulsion is another graphic example of how Shawinigan's unsurpassed emulsion technology is at work for you. For working formulations and technical information write to Shawinigan Resins Corporation, Dept. 41, Springfield 1, Mass.

SALES OFFICES: ATLANTA CHICAGO LOS ANGELES NEW YORK SAN FRANCISCO SPRINGFIELD

GELVA® *emulsions for paints*

SHAWINIGAN RESINS



Solve your odor problems with Shell Solvents

You'll sell more paint with these solvents . . . preferred for low odor and odorless products.

Shell Sol 71 and 72 . . . have no odor, are ideal for interior finishes, polishes and cleaners. Shell Sol 71 offers slightly faster evaporation.

Shell Sol 360 . . . much faster evaporation than mineral spirits, low odor, over 100°F. flash point.

Shell Sol 140 . . . a high-flash, slower drying solvent with unusually low odor.

Shell Mineral Spirits . . . traditional distillation range, solvent power and drying. Mild odor.

Typical properties of these Shell Solvents are contained in booklet shown. It will be mailed on request.

FACT—FROM SHELL RESEARCH

Odor stability is important.

SHELL OIL COMPANY

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100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

"How Johnnies-on-the-spot make ADM *Easy to buy from!*"

Handling sections of the country is nothing new for these men. They're ADM's Regional Resin Sales Supervisors . . . Johnnies-on-the-spot who go all out to put ADM's sales and technical service on the map in your locality.

Customer oriented, technically trained, they head up ADM's nation-wide sales organization. Like the Company's resin, oil, and chemical plants, these men are strategically stationed and really equipped. Their job is many-fold, but has a single purpose: to help your ADM sales representative give prompt, specialized attention to all your coating needs.

Yes ADM's regional resin sales service teams do everything possible—and a little more—to make ADM *Easy to Buy From*. Don't hesitate to call on them.

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700 Investors Building, Minneapolis 2, Minn.


NEW NEED IN
Dicalite

PAINT FORMULATIONS

MULTIPLE SOURCES FOR PAINT MANUFACTURING MATERIALS INCREASE PRODUCT EFFECTIVENESS

New developments and improved standards emphasize, more than ever, the need to examine several sources for every material recommended in paint formulations. Constant reliance on one vendor or one particular material runs the risk of missing such benefits as: (1) wider range of raw material grades, (2) improved product service, (3) new customer services, (4) better deliveries, (5) improved product performance relative to long range cost, etc.

Take flatting agents and pigment extenders, for example.

Dicalite has been producing them for years, even pioneered the use of diatomaceous silica in the paint industry. Their products are outstanding for constant uniformity and brightness (reading up to 90). Particle size range and distribution are also rigidly controlled.

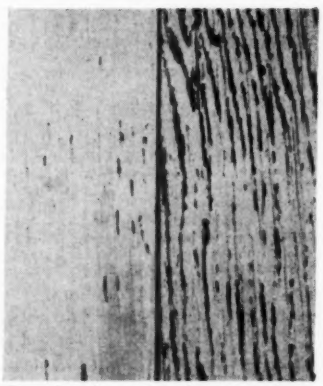
But, now Dicalite offers something new—a customized spec service.

This new service means Dicalite extender and flatting agents are custom produced to your exacting requirement. Include Dicalite (as one of several recommendations) in all your paint formulations. Test samples available on request.

Write today and see what a difference Dicalite can make.

Careful strata selection provides the best crude for each product's final requirements.

New processing refinements, including special calcining methods, control product characteristics with an accuracy never before possible in any plant.



Panels show two house paints after two years' exposure. Only difference in paints was extender. Dicalite, used in left panel, produced more durable paint.

Dicalite®
Dicalite Department
Great Lakes Carbon Corporation
612 So. Flower Street, Los Angeles 17, Calif.

Send information ☐ Have Dicalite man phone for appointment ☐

Send test samples ☐ _____ Intended use.

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TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

PV-3

NEWS FROM NAFTONE FOR MAKERS

Quality look finishes with high polymer Roskydal®

Quality has many facets. And so has ROSKYDAL, the "diamond" component of chemical coatings.

First, it gives furniture a *quality look*—a diamondlike depth in the finish. Second, it protects furniture from many kinds of hard usage such as knocks, scratches, weathering, and damage from hot dishes, wet glasses and spilled nail polish.

The secret is in the chemical build-up that takes place after the coating has been applied. This outstanding ability to polymerize gives the finish beauty and durability both. *High polymers mean high quality!* Other features: these resins are air curing... do not require paraffin for hardening. Also, Roskydal polyester resins are almost 100% solids. Therefore a single coating can be applied in almost any desired dimension... paper thin or board thick.

Roskydal finishes are clear or pigmented, high-gloss or mat depending on formulation and after-treatment. Mar resistance can be developed to 60 Sward hardness and the gloss reading to 96°. Flexibility, too, can be adjusted to specification to give excellent cold-check resistance to wood surfaces.

Roskydal coatings are ideally suited to furniture of every kind—from display cases to dining room tables. Clear Roskydal enhances the beauty of natural-grain wood... gives excellent protection to plastic and printed synthetic-grain surfaces on chipboard. Pigmented Roskydal can be formulated to provide good adhesion to wood or metal for kitchen cabinets and furniture... protects and beautifies outdoor furniture too. ■ Roskydal polyester resins are distributed by Naftone to the paint and varnish industry.

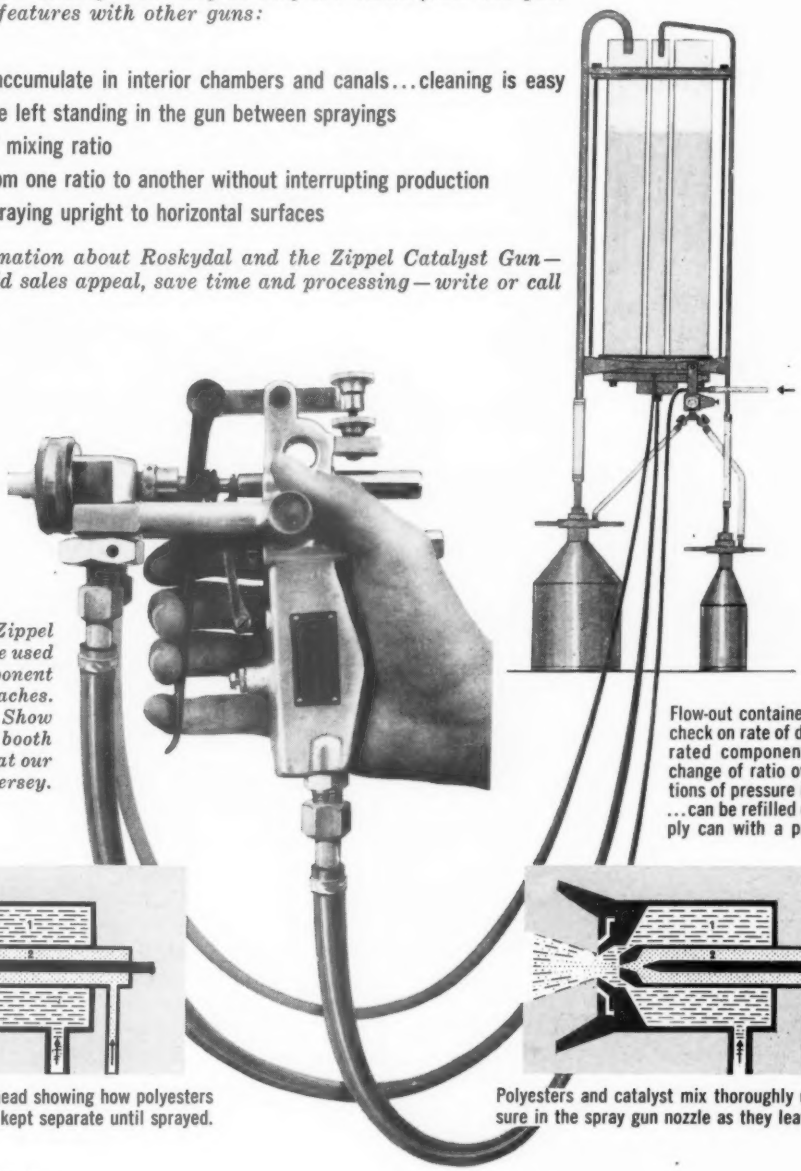
® Registered trademark of Farbenfabriken Bayer A. G., Leverkusen, Germany.

OF FURNITURE AND COATINGS

Roskydal coatings can be applied in many ways, but the most efficient method is by the new, patented ZIPPEL CATALYST GUN. The great advantage of its unique design is the ability to keep polyesters and catalyst separate—mixing them only as they are blown from the gun. Compare these features with other guns:

- Solids do not accumulate in interior chambers and canals...cleaning is easy
- Material may be left standing in the gun between sprayings
- Sure control of mixing ratio
- Fast change from one ratio to another without interrupting production
- ...And from spraying upright to horizontal surfaces

For more information about Roskydal and the Zippel Catalyst Gun—how they can add sales appeal, save time and processing—write or call Naftone.



The Zippel Catalyst Gun can be used for all two-component finishes and bleaches. See it at the Paint Show in Chicago, Naftone's booth No. 113 — or at our laboratory in New Jersey.

Flow-out containers give a visual check on rate of drop of the separated components...eliminate change of ratio owing to fluctuations of pressure in the ring main ...can be refilled direct from supply can with a pressure siphon.

Diagram of spray gun head showing how polyesters (1) and catalyst (2) are kept separate until sprayed.

Polyesters and catalyst mix thoroughly under pressure in the spray gun nozzle as they leave the gun.

NAFTONE INC.

425 Park Avenue, New York 22, N.Y.

CARGILL

PROGRESS REPORT ON ISOPHTHALIC RESIN EMULSION XE-1302

CARGILL'S XE-1302 is a new high solids emulsion of a fluid film-forming Isophthalic Resin. Because of the nature of the resin, XE-1302 is not subject to the pigment binding and adhesion limitations of latexes. ■ XE-1302 has a wide variety of applications. Low cost *flat wall paints* can be formulated with XE-1302 which have excellent flow and leveling characteristics, are dead flat and have outstanding scrubability at high PVC's. *Gloss wall enamels* can be formulated with excellent gloss at pigment loadings similar to those used in conventional solvent enamels. In combination with other resins, XE-1302 *floor paints* show outstanding wet adhesion and good wearing qualities. Favorable initial exposure data together with outstanding adhesion to synthetic chalky surfaces suggest evaluation of XE-1302 in one coat *exterior emulsion paints* and *exterior primers.* ■ Test fence exposures based on XE-1302 are now 1½ years old. In general, overall durability is quite promising in both whites and tints.

Samples and bulletins on XE-1302 resin emulsion are available by writing to Cargill.

CARGILL INCORPORATED

200 Grain Exchange, Minneapolis, Minnesota

PIGMENT TECHNOLOGY AT ITS BEST

SURPRISED that iron oxides, as made by Williams, are used in fields as remote from paint as missiles? Well, they are . . . because Williams' iron oxides are recognized superior for almost any application. That's why they're specified whenever perfect iron oxide performance is essential to the quality of finished product – be it paint or rockets! For "Pigment Technology at its Best," your answer is Williams. See your Williams representative – or address Dept. 23, C. K. Williams & Co., 640 N. 13th St., Easton, Pa.

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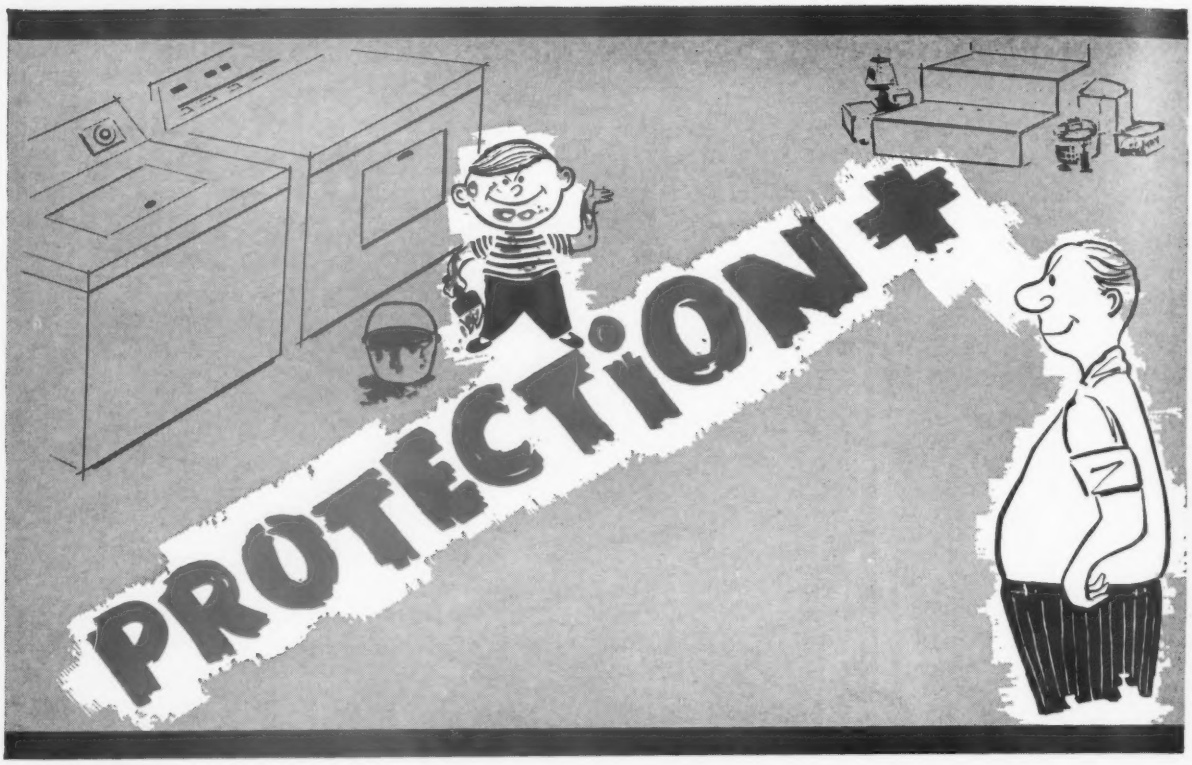


NOW! OFFER "PROTECTION-PLUS" IN CONCRETE FLOOR PAINT MADE WITH

MARBON 9200®

Soluble High Styrene Paint Resin

- *Resists acid*
- *Resists alkali*
- *Not harmed by oil or grease*
- *Bars water vapor*
- *Dries rapidly*
- *Permits wide range of colors, flexibilities, and degrees of hardness*

Paint made with Marbon 9200 gives concrete floors full protection against acids, fumes, weather and water —*plus* superior brush-on qualities, better coverage, and controlled drying. Marbon 9200 gives an attractive gloss too, and builds a tough film that takes the heaviest traffic in stride. These are all reasons why paints containing Marbon 9200 can do a bang-up job of helping to build your sales.

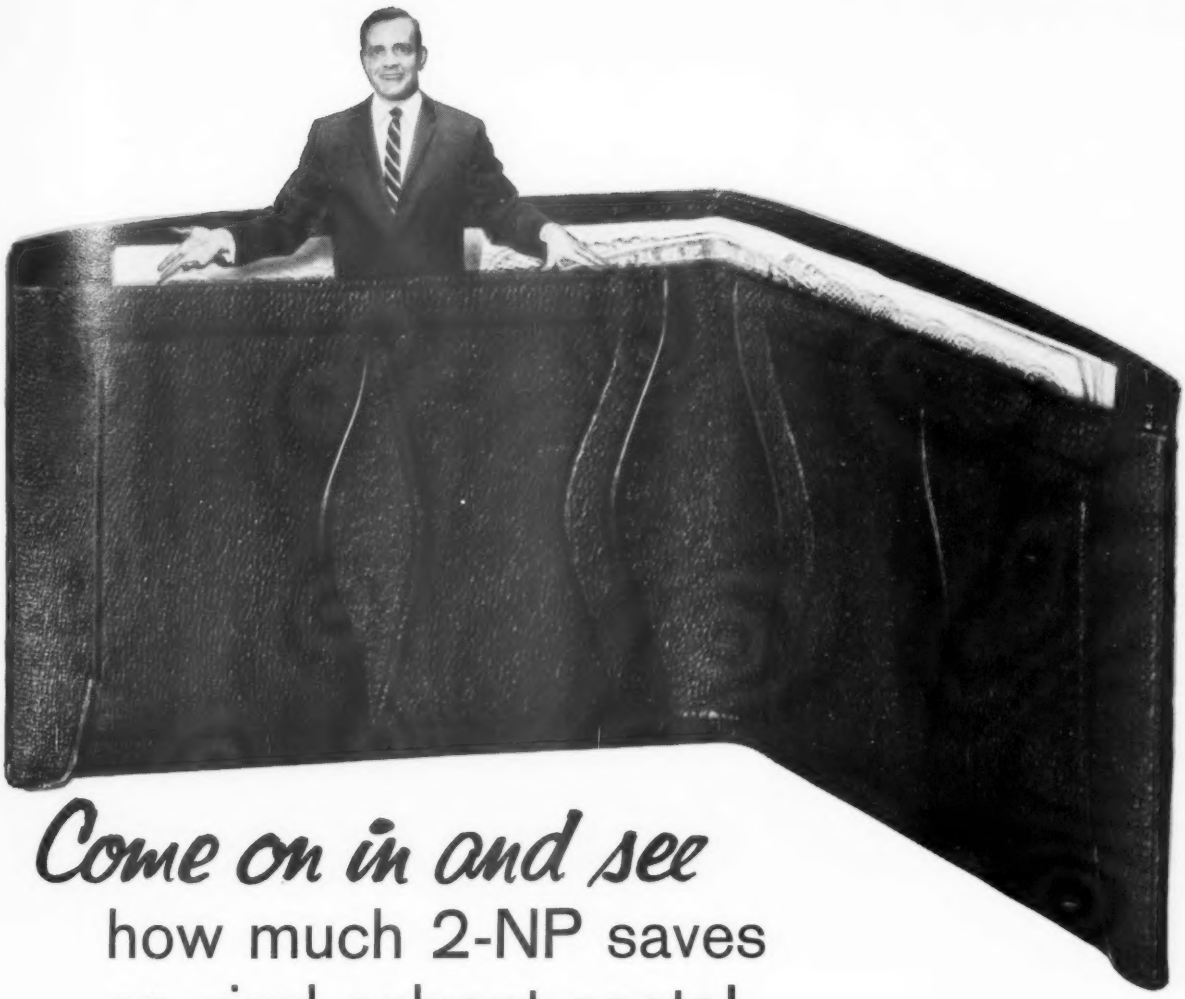
Marbon 9200 is a unique type of binder that provides long package stability. It is specially designed for simple cold-set stir-in when making all types of paints, from clear lacquer to semi-flat. No cooking equipment needed. Production is fast and economical —to help you keep your prices attractively low.

Get the facts—write today for complete information

MARBON CHEMICAL
WASHINGTON

MARBON CHEMICAL B-W BORG-WARNER

DIVISION **BORG-WARNER**
WEST VIRGINIA



Come on in and see
how much 2-NP saves on vinyl solvent costs!

CSC 2-Nitropropane is being used more and more in vinyl solutions. And for good reason. It saves money. *Real* money—up to $500 per tank car of vinyl solvent in some formulas!

Sound formulating does the economizing. The cosolvent effect of 2-Nitropropane with Toulene permits an increase in aromatic content in many, many formulations. You get the results you want at sizable $ savings.

And while you're improving the profit picture, you're improving quality, too. 2-Nitropropane contributes lower viscosity . . . slower evaporation rate . . . improved flow . . . less solvent retention . . . reduced odor . . . and faster hardening time.

CSC's Technical Bulletin No. 7 supplies all the facts, figures, why's and wherefore's. And shows how you can save by formulating vinyl solutions with 2-NP. Just fill out the coupon and mail today for your copy.

INDUSTRIAL CHEMICALS DEPARTMENT

COMMERCIAL SOLVENTS CORPORATION

CSC CUT COSTS

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Send me the complete money-saving story "Cutting Costs of Vinyl Solutions with 2-Nitropropane"

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Surfaces like these protected against rust with

ALL THREE COATS

with

EAGLE-PICHER PERMOX® 1-4-3 (one-for-three)

Permox 1-4-3 is an unusually effective anti-corrosive paint pigment. Using it as the basis for all three paint coats—primer, intermediate and finish—surfaces such as bridges, storage tanks and farm implements, exposed to severe weather conditions, are provided with *cumulative* protection against rust.

Paints made with Permox 1-4-3 are easily tinted and have excellent chalk resistance. These qualities make possible the production of durable, rust inhibitive maintenance paints and enamels in an almost unlimited assortment of contrasting colors and with superior tint retention.

Suggested formulations are available for a wide variety of these anti-corrosive and decorative paints designed for specific needs. We welcome inquiries and are prompt to respond.

Permox 1-4-3 Conforms to ASTM Specification D-1648

Since 1843

EAGLE EP PICHER

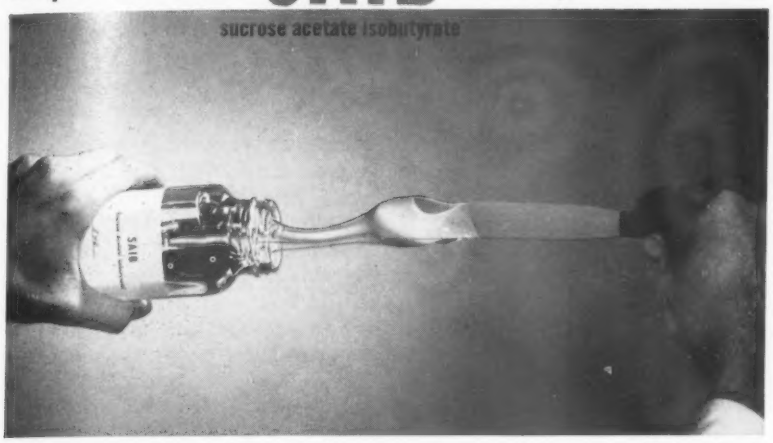
EAGLE-PICHER

The Eagle-Picher Company • Dept. PVP-10 **Cincinnati 1, Ohio**

Regional Sales Offices: Atlanta, Chicago, Cleveland, Dallas, Kansas City, New York, Philadelphia, Pittsburgh.

West Coast Sales Agent, THE BUNKER HILL COMPANY, Chemical Products Division • Seattle • Portland • Oakland • San Francisco • Los Angeles

Unique function of SAIB aids lacquer formulators



SAIB has a molecular weight of 838. At room temperature, it is a semi-solid. Its color is exceptionally light and its color stability upon exposure to heat or ultraviolet light is excellent. (Heated to 175°C. for a period of 6 days, its color increases slowly to straw yellow, with no appreciable change occurring until after 24 hours of heat-aging.) SAIB is unaffected by contact with bronze powders. It is compatible with a wide variety of polymers, modifiers and plasticizers and is highly soluble in most common solvents. (A 90% solution of SAIB in ethyl alcohol has a viscosity of only 750 centipoises at 30°C.)

SAIB increases solids content

The high degree of compatibility exhibited by SAIB with virtually all major film-formers coupled with its exceptional solubility in common lacquer solvents *(see table below)* permits formulation of high-solids lacquers at practical application viscosities.

Viscosity of 50% SAIB Solutions

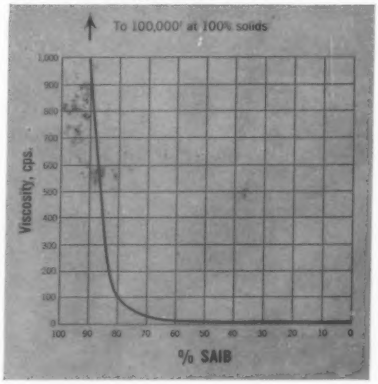
(Brookfield viscometer, 25°C.)

Solvent	*Viscosity, cps.*
Ethyl alcohol	*8*
Isopropyl alcohol	*14*
Ethyl acetate	*8*
n-Butyl acetate	*9*
Toluene	*9*
Hexane	*6*
Methyl ethyl ketone	*6*
Methyl isobutyl ketone	*8*
1-Nitropropane	*11*

SAIB improves film properties

One of the most significant characteristics of SAIB is its effect on film hardness at high modification. With nitrocellulose, for example, the Sward hardness of a 50% SAIB-modified film is increased from 65 to 78. Higher modification yields softer films. Cellulose acetate films also are increased in hardness upon addition of SAIB. In this case, however, maximum hardness occurs at a concentration of about 25%. With cellulosic films other than nitrocellulose and cellulose acetate, high modification produces only a slight decrease in hardness with no significant change in solution viscosity.

Viscosity of Solutions of SAIB in Ethyl Alcohol at 25°C.



Other film properties can often be improved. Plastic lacquers formulated with Half-Second Butyrate and SAIB, for example, show very good adhesion to Mylar polyester film and nylon. Such lacquers can also be made heat-sealable. Vinyl and acrylic solutions when modified with SAIB show improved sprayability and less tendency toward cobwebbing, with no significant change in viscosity.

Good flexibility in many SAIB-modified polymers can be achieved by including small amounts of Eastman polymeric plasticizer NP-10.

How does SAIB function in lacquer systems?

Note that the room-temperature viscosity of a solution of SAIB in ethyl alcohol remains below 10 centipoises up to 50% solids, increasing to only 100 centipoises at 80% solids *(see graph)*. At this point, however, the viscosity increases sharply to the 100,000+ level of pure SAIB. A similar relationship exists between SAIB and other common lacquer solvents.

At the highest conceivable concentration at which SAIB might be used to modify a lacquer system, therefore, its effect on application viscosity is negligible. Even after much of the solvent has evaporated from the film, SAIB does not hinder flow-out or leveling. While this phenomenon might also be observed with certain plasticizers, SAIB does not exhibit plasticizing properties, hence its very limited effect on the resulting film.

Because of its unique behavior, plus its low color, stability and reasonable cost, SAIB offers a new approach to lacquer formulation. It is supplied both as a 90% solution, designated *SAIB-90*, and in the undiluted form, designated *SAIB*. For a sample of SAIB, as well as a technical report on its physical properties and performance in coatings, write your nearest Eastman sales office or EASTMAN CHEMICAL PRODUCTS, INC., Chemicals Division, KINGSPORT, TENNESSEE.

SAIB

SUCROSE ACETATE ISOBUTYRATE

Eastman CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company

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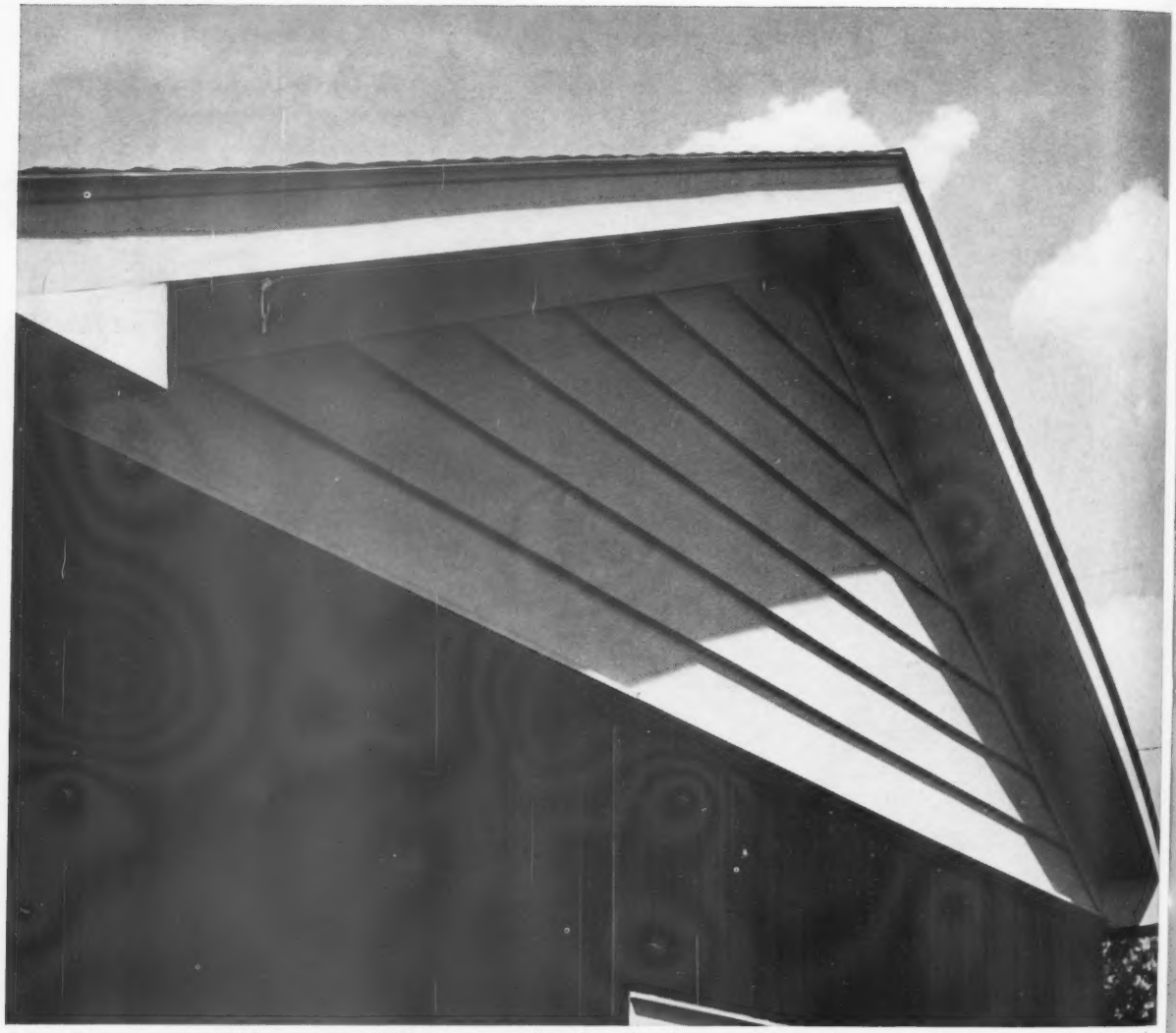
DOW | LATEX



15-month exposure of a 2647 topcoat over 2647 primer, on cedar siding. Film shows no deterioration, no rust streaks over steel nail-heads.

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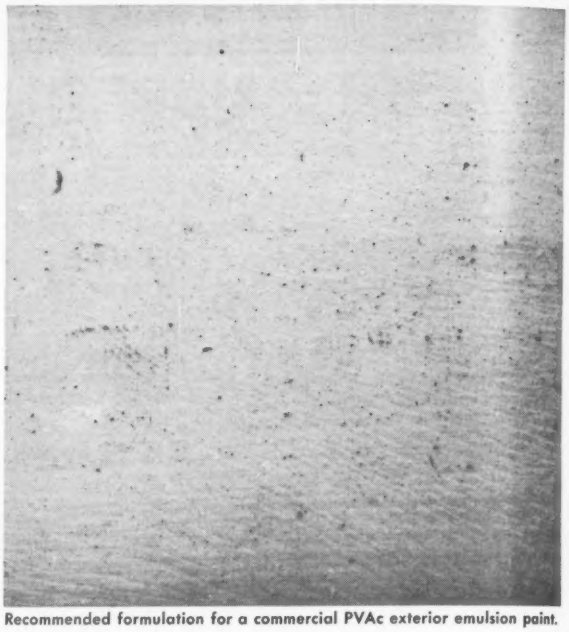
Panels exposed at 30° angle in an industrial atmosphere. Compare the difference in dirt pick-up 2 weeks after painting.

Commercial formulation of an acrylic exterior emulsion paint.



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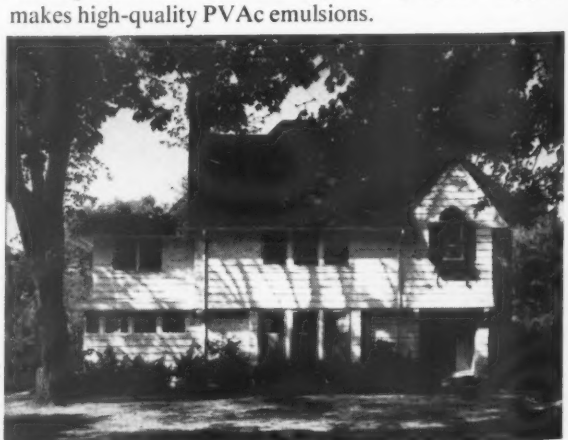

The PVAc paint on this Shaker Heights, Ohio, house still looks fresh and clean 3 years after application.

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CHEMICALS

FOREWORD

AFTER many years of extensive research and testing, latex paints for exterior wood were introduced to the consuming public this past Spring.

Consumer reaction to this new concept in house paints was most favorable because of the remarkable performance qualities of these paints plus their easy-application and clean-up features. Claimed advantages of these water emulsion paints include quick drying, high resistance to fading, yellowing, cracking, blistering and peeling, and increased durability over conventional house paints.

However, producers of such paints insist that application instructions must be adhered to the letter for these latex paints to perform successfully on exterior wood. As a result they have gone to great length to impress the user of the importance of following directions. For example, one manufacturer has this warning printed on the lid of each can:—"Use this unusual new paint as directed or please don't use it."

Most instructions recommend careful surface preparation followed by an oleoresinous primer. However, an all latex system—primer and top coat—is most desirable. Such systems are currently being evaluated and have shown considerable promise in exposure testing programs. Some of the developments in all-latex-primer and top-coat systems are discussed in the following articles.

Latex house paints are by no means perfect. They do have some deficiencies; mainly poor adhesion to badly chalked surfaces, staining over redwood and cedar, and grain cracking along the line of the wood. However, their good properties such as tint retention, cleanliness and high durability overshadow these shortcomings which can be corrected by proper surface preparation and priming.

Estimates are that the total volume of exterior latex house paints will reach two million gallons this year, gradually building up to 30 million gallons within the next ten years.

The articles which follow are designed to give you the latest technical information on how to formulate and manufacture high quality latex house paints. Much of this information is based on extensive outdoor testing to insure best results.

It is our sincere hope that these comprehensive features on latex house paints will bring you new ideas for further investigation and evaluation in your laboratories.

The Editor

Because of the high shock resistance and the general toughness required of a good exterior paint for wood, only high molecular weight copolymers are satisfactory.

By
Harold L. Jaffe*
and
Jack Fickenscher**

VINYL LATEX EMULSIONS

THE introduction of emulsions for use in interior wall paints was treated with a great deal of skepticism and criticism. From this warranted criticism and most desirable skepticism grew the multitude of latices available to the paint formulator today. From these latices are now made a tremendous volume of interior flats, primer sealers, and exterior masonry paints. With the introduction on the market in 1959 and 1960 of a relatively small number of latex house paints, the industry is once again involved with the very serious problem of evaluating a new technique in one of our most critical markets. The questions at hand are: Why latex house paints? What problems are involved in latex house paints? What latex may best overcome these problems? How do I formulate to get the best possible paint out of the latex? This paper is an attempt to present some answers to these vital questions.

Why Latex House Paints?

Latex house paints have much to offer the formulator as a tool in producing excellent house paints. First, they offer tint retention to a degree heretofore impossible to obtain. Sparkling, beautiful whites can be obtained, and maintained without the degree of chalking necessary with present day solvent base systems. They can, properly applied, give excellent blister resistance, a property most necessary in many parts of this country. They promise a durability far beyond anything the paint formulator has been able to produce in the past which might help stem the tide so rapidly running toward exterior surfaces which do not need painting. It is not necessary to reiterate once again the ease of clean-up and the many other properties in these paints which have helped win them such wide consumer acceptance in interior flats and exterior masonry paints.

There are, however, certain faults with these paints which must be overcome if the desirable properties listed above are to be obtained. The faults are erratic adhesion to chalky surfaces such as encountered in repainting badly chalked oil or masonry paints, cracking in the direction of the grain of the wood and staining when applied directly over woods such as cedar and redwood which contain water soluble dyes.

The chemical and physical nature of these latices give some clue as to the reasons behind the good and bad properties of latex paints itemized above. The excellent durability of these materials may be, in part, attributed to their excellent resistance to ultraviolet light degradation. While these ma-

Four year old house in New Jersey area, stucco with wood framing, painted with Flexbond 800 house paints.

*Technical Director, **Supervisor Paint Technical Service, Colton Chemical Co., A Div. of Air Reduction Co., Inc., Cleveland, Ohio.

terials are attacked by ultraviolet light, they are not affected in any sense as rapidly or as drastically as the oils and other materials presently used in solvent base house paints. They can be formulated to give excellent toughness and flexibility and to retain these properties for an indefinite period of time through the correct selection of monomers and polymerizing techniques. Blister resistance comes through the ability of these films to pass moisture vapor through the film. Their lack of adhesion may be understood if we consider chalk as a filter and even more, a hydrophobic filter. All of the latex systems available for exterior use are macro in size when compared with the molecular size of the oils used in solvent base systems. In addition to this, the oil dries at a very slow rate and is fairly mobile over an extended period of time when compared with an emulsion film which dries rapidly and in which particles lose their mobility rapidly. It is this combination of size and early lack, of mobility which we feel causes the difficulty in binding chalk.

In a paper presented in 1959 and 1960 to a number of the production clubs, the authors have shown a direct relationship between grain cracking and a "modulus of elasticity" for these latex films. Tensile strength of latex paint films is extremely high and at pigmentation level normally associated with exterior exposures, their elongation is quite low. The combination of these factors give a paint film which is too brittle to withstand the contraction and expansion of the wood substrate without cracking. This same paper gives formulation data and technique which could lead to a water emulsion primer for use directly over bare wood for commercial applications.

Four year old framehouse in New Jersey area, painted with Flexbond 800 paints.

Which Emulsion?

In attempting to decide which resin to use for an exterior house paint, the formulator is faced with a bewildering array of materials. We, at Colton, manufacture over 50 different emulsions at this time. With this volume of different materials available, it is almost impossible for the formulator to test each and every resin himself. The chemical composition of these materials is almost as varied as the chemical composition of the alkyd resins available. There are copolymers of two or more acrylic monomers, vinyl acetate homopolymers, vinyl acetate copolymerized with a variety of ingredients, such as vinyl stearate, dibutyl maleate, dibutyl fumarate, acrylic monomers, and others. In addition, there are varying percentages of these various monomers in any given composition, the variations in protective colloids, emulsifying agents, percentages of these ingredients, and last, but far from least, polymerization techniques. With this tremendous variety possible in the chemical structures of the polymers presented to the paint man, it becomes immediately apparent that it is impossible to class a material as a vinyl acetate copolymer and thus correlate results obtained with any other so-called vinyl acetate copolymer. It is this problem which we feel is one of the major hazards in manufacturing exterior house paints. How can we minimize testing work on the variety of emulsions available and still test only those emulsion which should give the most effective paint?

As mentioned earlier, we, at Colton, make well over 50 different emulsions. However, for exterior house paint, we recommend our Flexbond 800 copolymer emulsion. The reason why we feel this polymer performs well on exterior exposure and the reasoning used in deciding to develop such a polymer, is perhaps a good way of pointing out the properties essential in making a successful water house paint. Our original exposure work indicated that only a copolymer should prove completely satisfactory for exterior house paints. The homopolymers which we had orignally exposed, showed somewhat rapid chalking and excessive cracking with age. It has been demonstrated that there is a good possibility that normal plasticizers used with homopolymers are quite volatile which would cause embrittlement and increase in tensile strength to the film as it ages. There is always a possible migration of this plasticizer into any oil paint substrate.

Polymer Structure

Because of the high shock resistance and the general toughness required of a good exterior paint, it was felt that only high molecular weight copolymers could be completely satisfactory. A high comonomer content was absolutely necessary for such a polymer to give a good degree of flexibility to withstand the expansion and contraction of a substrate such as wood. Such a material of both high molecular weight and very high comonomer content has an excellent chance of having the necessary flexibility and toughness to withstand thermal shock, expansion and contraction, and impact from airborne particles.

Such a polymer should also have a wide second order transition range. The second order transition range is defined as that range in temperature during with a heterogeneous plastic polymer such as the one we are describing above would

go from a brittle, glassy hard stage, to a soft, extremely tacky stage. The desirability of having the broadest possible second order transition range becomes readily apparent when we consider the need for good film fusion and flexibility at low temperatures, coupled with a lack of tack under the high temperatures which occur on exterior exposure in the summer time. If the tack is high at high temperatures, dirt pick up becomes a problem and if the polymer is lacking in flexibility at low temperatures, embrittlement and consequent cracking and flaking can be expected. This lack of broad second order transition is apparent in many of the polymers offered to the market today. These polymers, unless they are very highly pigmented, show excessive dirt pick up on exposure.

Accompanying this article Figure 1 shows three paints at 25% pigment volume concentration which were exposed for three years, 45° south on white pine. Two coats of the 25% PVC paints were applied directly to the pine board without any priming. The panel in the center marked A-6 is made with Flexbond 800 emulsion described in the preceding paragraphs. The other two panels were painted with two commercial low molecular weight polymers having relatively low comonomer content. As can be seen, the Flexbond 800 polymer did not show any grain cracking. The other two polymers failed badly by cracking and by flaking.

It should not be construed that we are advocating painting bare wood at 25% PVC. White pine panels are considerably better on resistance to cracking than other woods such as yellow pine or flat grain redwood. At the higher PVC's desirable for cost and cleanliness, grain cracking will occur on white pine with any polymer. The panels do illustrate, however, great difference between copolymers of vinyl acetate which do not have, or which do have, the optimum properties listed above.

In review, we can demonstrate the necessity for high molecular weight, high comonomer content, broad second order transition range as three prime prerequisites of a polymer if it is to be successful on exterior exposure.

Formulation

However, the best polymer in the world is only as good as the formulation. What is necessary in an exterior house paint formulation? First, water soluble colloids should be kept to a minimum. Sufficient dispersants and wetting agents must be present in order to get a completely well wetted and dispersed pigment system. If titanium is not dispersed, its ability to furnish hiding is greatly impaired. It has been shown in our laboratory that unless the pigment system is well wetted, film formation is definitely sub-standard and exterior durability is degraded. It also goes without saying, that water sensitive surfactants and dispersants should only be present in the necessary amounts in order to decrease the water sensitivity of the resultant film. A small amount of anatase titanium is used which gives a good cleansing action to the film without causing excessive chalk so as to cause washdown on any masonry construction below the painted surface. We use talc in our recommended formulation, although we have gotten excellent results with carbonates and other extenders.

Mildewcide level in this recommended formulation is probably adequate for many areas in the country, but in high mildew areas such as some parts of Florida, and the Gulf Coast, and many other such areas, considerably increased amounts would be most highly recommended.

Pigmentation

Our total pigment volume concentration in this white formulation is approximately 36%. This is sufficiently high to prevent dirt pick up, will not crack on correctly primed surfaces, and gives very excellent durability.

Our exterior tint base formulations uses only rutile titanium dioxide in order to get maximum tint retention. Again, wetting agents and dispersants must be carefully determined in order to get a well wetted system, sufficient to developed color readily and yet not so much that water sensitivity of the film is seriously impaired. In addition to the extender pigment shown in our recommended formula, we have found excellent tint retention with calcium carbonates, clays, and other extenders. Our PVC in this case is 32% which we feel is again a very optimum point. It is a point at which we have had exceptionally good tint retention, which does not allow for excessive dirt pick up on exposure and which has excellent durability.

Coloring pigments for these water emulsion paints should be only those pigments which have proved themselves over the years suitable

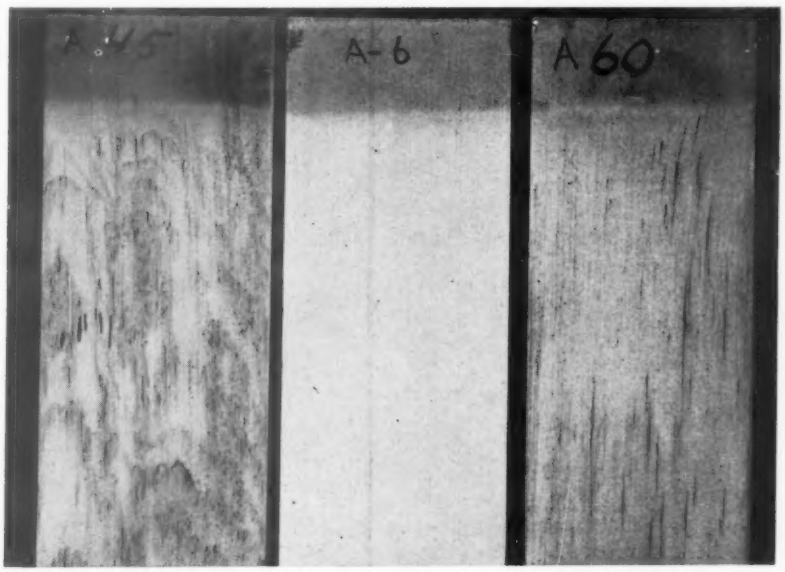


Figure 1. These panels were exposed three years, 45° S, Elkton, Md. All three paints are at 25% PVC, two coats on white pine. The A-6 panel is Flexbond 800. The A-45 and A-60 are commercial low molecular weight resins.

for exterior exposure. In addition to light fastness, it should be borne in mind that one feature of latex house paints are their ability to be used over masonry. For this reason, pigments should be alkali resistant so that they will not burn out when applied to alkaline surfaces.

Priming

At the beginning of the paper we listed a number of faults that occur with water latex paints. These included erratic adhesion to badly chalked surfaces, staining over redwood and cedar, and grain cracking along the line of the wood. At the present time, the only possible answer to these faults is the use of a zinc free oil primer in order to bind the chalk, or to use as a first coat over new wood to prevent grain cracking. Such a system also minimizes staining. Formulations which we recommend, would be those which would meet government specifications TTP-25a. It is most necessary that a high level of mildewcide be included in the primer if the resultant system is to be mildew free.

From the sales standpoint, the use of an oil primer is most objectionable. However, at this time, we do not feel any all-water systems sufficiently tested for commercial exploitation. We, at Colton, feel that such a water primer is possible for use over bare wood. Such a primer has been under tests on our test fences and test houses for over a year at this time. Included with this article is the experimental water primer formulation No. 1398-19. This primer is based on the properties of the resin, Flexbond 800, with its high molecular weight, high comonomer content. It is formulated at a PVC where its "modulus" is such that when it is top-coated with the regular 36% PVC polyvinyl acetate paint, grain cracking will not occur. It is not recommended that this primer be used commercially at this time, but it is included here as an indication of the possible type materials which will be available in the future.

In summation, we would like to point out that in spite of the faults of these systems which presently require an oil primer, they do offer tint retention and cleanliness and a long life such as is not obtained with other systems. It bears repeating that this is, with the correct zinc free oil primer, a blister resistant system which should minimize many of the blistering problems which are becoming so important in many areas of the country.

Raw Material Listing

Natrosol 250 High	Hercules Powder Company
Polyglycol P-1200	Dow Chemical Company
Igepal CTA-639	Antara Chemical Company
Igepal CO-610	
Titanox RA-50	Titanium Pigment Corporation
Titanox A-168-LO	
Nytal 300	R. T. Vanderbilt Company
Carbitol Acetate	Union Carbide Chemicals Co.
Cellosize WP 4400	
Potassium Tripolyphosphate	Victor Chemical Works
Ti-Pure R-610	E. I. Dupont de Nemours & Co.
Lorite	DeLore Division, National Lead Co.
Flexbond 800	Colton Chemical Company

EXTERIOR WHITE

Natrosol 250 High (2% Solution)	200
Polyglycol P-1200	3
Igepal CTA-639	2
Lecithin—Water Dispersible	3
Ethylene Glycol	25
Antifoam	2
Titanox RA-50	225
Titanox A-168-LO	25
Nytal 300	70
Phenyl Mercuric Acetate	6
Water	195
Carbitol Acetate	12
Flexbond 800	340
Yield	101 gals.
PVC	36%
Solids	45%

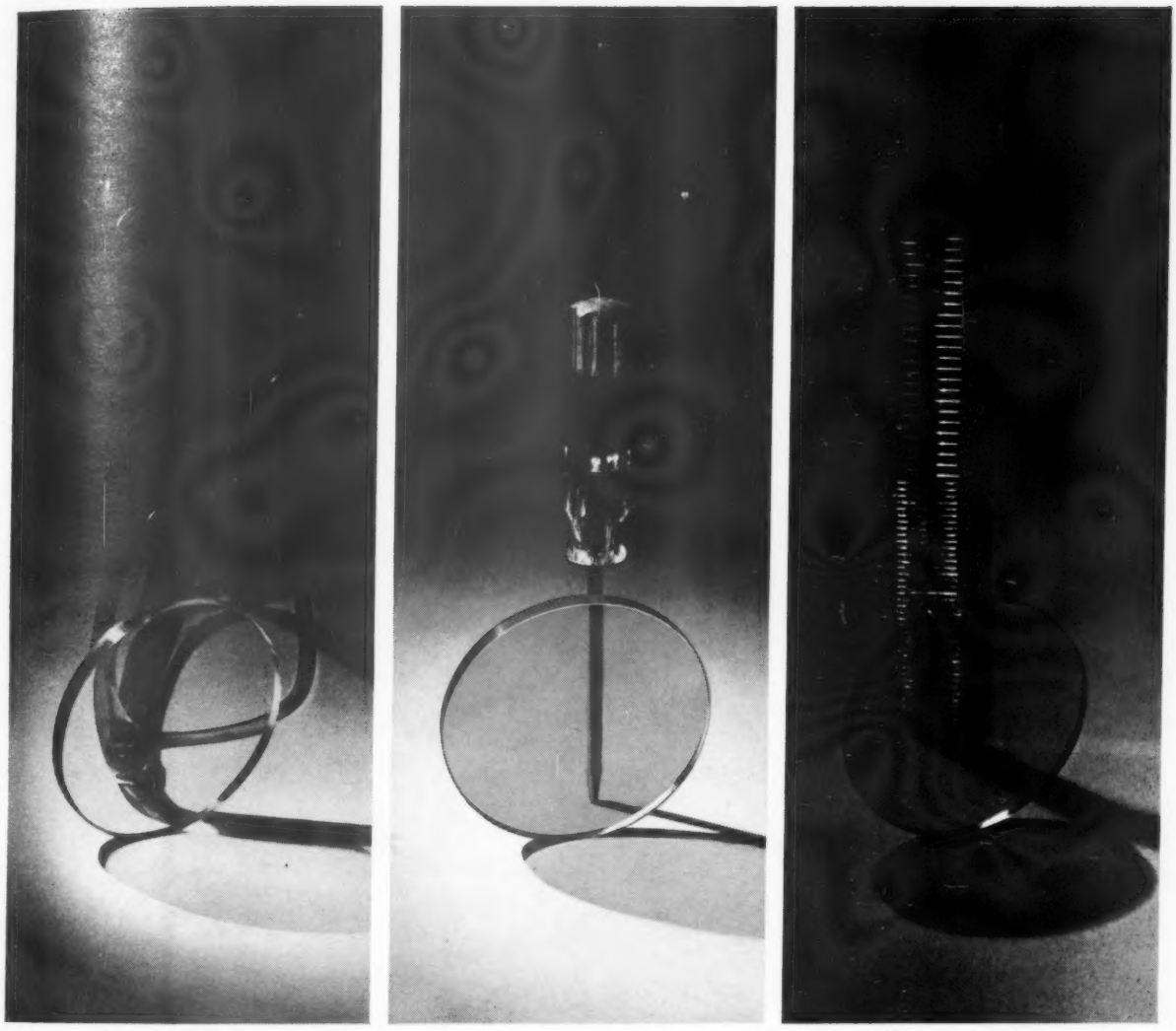
EXTERIOR TINT BASE

1. Cellosize WP-4400 (3% Solution)	145
2. Antifoam	2
3. Potassium Tripolyphosphate	2
4. Lecithin, Water Dispersible	3
5. Ethylene Glycol	18
6. Ti-Pure R-610	150
7. Lorite	115
8. Phenyl Mercuric Acetate	6
9. Igepal CO-610	3
10. Carbitol	16
11. Water	215
12. Flexbond 800	380
Solids	44%
PVC	32%
Yield	100.6

EXPERIMENTAL

EXTERIOR WOOD PRIMER

Natrosol 250 High (2% Solution)	210
Antifoam	2
Igepal CTA 639	4
Lecithin, Water Dispersible	5
Ethylene Glycol	25
Titanox RA-50	155
Phenyl Mercuric Acetate	6
Water	105
Carbitol Acetate	12
Flexbond 800	466
Yield	100 gals.
PVC	15%
Solids	40%



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Light Red No. 80
Medium Light Red No. 90
Medium Red No. 100
Dark Red No. 110
Maroon No. 120

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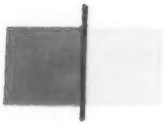

Cadmium Lithopones

Primrose No. 20
Lemon No. 30
Golden No. 40
Orange No. 50

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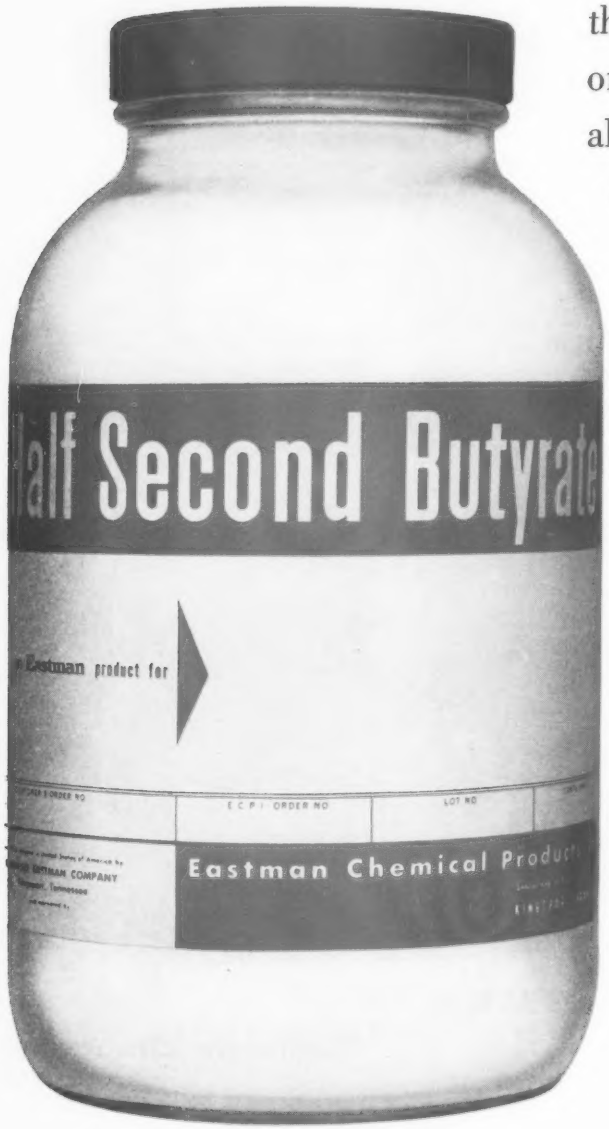

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an Eastman film-former

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greensboro, North Carolina; Houston; Kansas City, Missouri; New York City; Philadelphia; St. Louis. **West Coast: Wilson & Geo. Meyer & Company,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Paint based on new experimental emulsion vehicle exhibits high durability and good water-spot resistance in preliminary exposure tests.

FORMULATING EXTERIOR EMULSION PAINTS

By
Murray H. Roth*
and
Herbert Terry**

THERE is considerable discussion throughout the paint industry concerning the best practices for formulating and applying emulsion exterior paints for wood. This application may be divided into painting over new wood and repainting over aged oil paint.

Oil-Based Primer

On new wood there are numerous exposures of acetate homo and copolymers self-primed that show excellent weathering properties. However, there have been enough failures in adhesion over certain woods to indicate that a higher degree of penetration should be obtained with the first coat. A zinc-free primer such as one conforming to TT-P-25a has been found satisfactory in this respect. In the case of cedar, the use of an oil-based pigmented primer has been found to increase resistance to staining when used under a polyvinyl acetate paint topcoat. Where a conventional oil-based topcoat was used or where the emulsion paint was used self-primed, the level of staining was greater.

The use of properly formulated polyvinyl acetate paints over a suitable oil-based primer yields a breathable coating system that has demonstrated excellent performance over wood in New England and Canada. Recently we inspected the condition of the paint film on a New England country home and found it to be in fine shape on all sides after more than three years exposure. It is expected that the life of such systems will be appreciably greater than

Table I. Gelva* Emulsion Exterior Paint 9052

	Weight, lbs.
Daxad 30	2
Ethylene glycol	30
R & R-551	0.5
Water	120
TiPure R-900	175
Duramite	175
325 Waterground Mica	30
Nopco JMY	1
d-Limonene	1
PMO-30	1.5
Grind	
3% 1500 cps. Methocel	178
Emulsion RS4268	367
Mix (Carbitol	10
and (Carbitol Acetate	10
add (Water	20
Acrysol G-110	10
	1131 (100 gals.)

NVM: 50%
Viscosity: 97 K U
Freeze-thaw stability: Passed 5 cycles
PVC 40%
* Registered trademark

*Technical Service Representative, **Group Leader Research Dept., Shawinigan Resin Corp., Springfield, Mass.

oil-based products because of the greater ultraviolet resistance of the vehicle, lower chalking rate, and maintenance of adhesion under conditions of moisture vapor transfer.

Fine Particle Size Homopolymer

Also in our work we have included a fine particle size "latex-type" homopolymer. Plasticized with the much less fugitive Kronisol[1], this has been further modified with a semi-drying oil which contributes to better adhesion and flexibility of the system. A typical formulation using a post oil-modified emulsion is given in Table I. The oil-modified emulsion paint base is described in Table II and a method for making an oil dispersion suitable for addition to an emulsion paint is given in Table III. Copolymers formulated with oil are now under test.

Repainting Chalky Surfaces

For repainting over chalking oil paint a breathing type of penetrating primer is recommended as a first coat. Here again the TT-P-25a may be employed although there is some indication that a lead and zinc-free house paint based on alkyd may be superior. The problem, of course, is to penetrate and anchor the chalking portion of the aged oil paint. While oil-based primer-emulsion systems have been proven superior (to systems based wholly on oil) in tint retention, blister resistance, and weatherability, a disadvantage does exist in repaint application. This is the necessity of using a two coat system with solvent vehicle primer. Notwithstanding the longer life of the oil-based primer emulsion topcoat system, twice as much labor is required as well as roughly double the expenditure for paint. After the initial novelty of using emulsion exteriors has passed, many purchasers will question whether the increased life of the paint job warrants the extra time and money.

Using Surface Conditioner

One approach to the problem that we have been pursuing is the use of a water-based surface conditioner. Our object is to develop a conditioner that would be stored on the shelf and mixed with emulsion paint just before use. This

Table II. Emulsion RS4268

	Weight, lbs.
Propylene glycol	4
Diamond K Soy WOD	49.2
Kronisol	20
Mix and add:	
Pluronic F68, 25%	13.8
Mix and add:	
CMC 7H, 1%	47
Mix and add:	
Gelva* Emulsion TS85	233
	367

NVM: 55%

Note:

Phase inversion takes place during addition of the CMC and is preceded by marked thickening, so good agitation and careful handling is required.

Emulsion RS4268 deposits a clear film and has excellent stability, including freeze-thaw stability through 5 cycles.

*Registered trademark

Table III. Oil Dispersion

	Parts by weight
Diamond K Soy WOD	75
Gelvatol* 40-20, 45%	55
Water	203
	333

NVM: 30%

The dispersion is prepared by adding the Gelvatol Solution to the oil with good agitation. This addition should be made with some care since a phase inversion takes place. The final water can be added more rapidly, but no faster than can be handled by the agitation.

Addition at the rate of 1 gallon of this dispersion to three gallons of emulsion paint has shown promising results with respect to penetration over chalky surfaces. The Gelvatol appears to play a major role in this effect.

*Registered trademark

Table IV. Surface Conditioner 29820-4

	Parts by weight
I. Water	60
Hexylene Glycol	30
Gelva* Resin C-3 V-20	20
28% Aq. Ammonia)	1
Water)Premix	10
II. Water	104
Gelvatol* 1-30	6
Tergitol #4)Premix	3
Dibutyl Phthalate)	3
	237

Procedure:

1. Mix water in part I and hexylene glycol, heat to 65°C (150°F).
2. Add premix of diluted ammonia.
3. With good agitation, add C-3 V-20 resin quickly, stir until dissolved, then cool.
4. In separate mixing equipment, heat water of part II to 90°C (195°F). Add Gelvatol with good stirring and continue agitation until dissolved.
5. Cool part II and add mixture of Tergitol and dibutyl phthalate.
6. Finally, mix the cooled solutions of I and II.

Note:

The amount of ammonia used may have to be altered slightly depending upon equipment so as to give a final pH of 8-8.5. For greatest stability, the final pH should not exceed 8.5

*Registered trademark

Table V. Gelva* Emulsion Exterior Paint 7378

	Weight, lbs.
Tergitol NPX	1
Tamol 731	4
Water	150
Sodium Carbonate, anhydrous	0.75
TiPure R-900	175
Duramite	75
325 W. G. Mica	22
Nopco JMY	1
d-Limonene	1
Mix	
Water	250
PMO-30	2
Mix (Hexylene Glycol	15.4
and (Ethylene Glycol	30
add (Methocel 90 HG, 8000 cps	5
Gelva* Emulsion TS-70	336
	1068.15 (100 gals.)

Viscosity 102 KU
pH 7.7
PVC 33%
NVM 45%
Freeze-Thaw Stability: Passed 5 cycles
*Registered trademark

Table VI. Gelva* Emulsion Exterior Paint X4001

	Weight, lbs.
Tergitol NPX	1
Tamol 731	4
Water	150
TiPure R-500	175
Duramite	150
325 W. G. Mica	22
Nopco JMY	1
d-Limonene	1
Mix or Grind	
Water	225
PMO-30	2
Mix (Hexylene Glycol	15.4
and (Ethylene Glycol	30
add (Methocel 90 HG 8000 cps.	6
Emulsion RS4310	336
	1118.4 (100 gals. approx.)

Viscosity 93 KU
pH 6.85
NVM 48%
PVC 40%
Freeze-Thaw Stability: Passed 2 cycles minimum
*Registered trademark

system gives promise of yielding satisfactory hiding for repaint in one coat thus giving a completely water-based product. Excellent results have been obtained over chalking masonry using as pretreatment the surface conditioner shown in Table IV. These results have encouraged us to try adding the same conditioner to a copolymer exterior such as the one in Table V. Levels of 15-25% by volume have been tested and accelerated tests as well as exposures currently under way indicate favorable results. The depth of chalk of an aged oil paint is, of course, much less than the chalk in aged cement paint. Thus we can reasonably expect surface conditioners that have given good results on chalking cement-based paints to be promising as additives to emulsion topcoats for wood.

Experimental Emulsions

One of our newest experimental emulsion vehicles is a complex copolymer that has been compounded into an exterior paint with excellent accelerated durability. An unusual feature of this emulsion is its unusually good water-spot resistance. From the formulation given in Table VI, it will be noted that the PVC is 40%. With vehicles which permit this PVC level, improved resistance to dirt retention can be forecasted. General sampling on this new product should begin soon.

Our final point is concerned with the hiding of single coat applications. Many of the "do-it-yourselfers" have found that sufficient hiding is not given by one coat of the new latex exteriors. This is due to the much easier brushability of emulsion-based paints generally and to the amateur's tendency to brush out the paint too thin. One of the objectives in emulsion exterior research should be improving the build by suitable formulation.

Although problems exist, we are confident that emulsion-based exteriors will gain increasing acceptance through continuing contributions from research.

List of Manufacturers of Products Included in Formulations

Product	Supplier
Acrysol G-110	Rohm & Haas Co., Inc.
Carbitol	Union Carbide Chem. Co.
Carbitol Acetate	Union Carbide Chem. Co.
CMC 7H	Hercules Powder Co.
Daxad 30	Dewey & Almy Chem. Co.
Diamond K Soy WOD	Spencer Kellogg & Sons, Inc.
Duramite	Thompson, Weinman & Co.
Gelva Emulsions TS-70, TS-85	Shawinigan Resins Corp.
Gelva Resin C-3 V-20	Shawinigan Resins Corp.
Gelvatol 1-30, 40 -20	Shawinigan Resins Corp.
Kronisol	Food Machinery and Chemical Corp., Chemical and Plastics Div.
d-Limonene	R. D. Webb & Co.
Methocel	Dow Chemical Co.
Methocel 90 HG	" " "
325 Watergrund Mica	English Mica Co.
Nopco JMY	Nopco Chem. Co.
PMO-30	Troy Chem. Co.
Pluronic F 68, 25%	Wyandotte Chem. Co.
R & R-551	Ross & Rowe Co.
RS 4310 Emulsion	Shawinigan Resins Corp.
Tamol 731	Rohm & Haas
Tergitol NPX, #4	Union Carbide Chem. Co.
TiPure R-900, R-500	DuPont Pigments Div.


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A. C. Mueller Co., Cleveland, Ohio
Van Horn, Metz and Co., Conshohocken, Pa.

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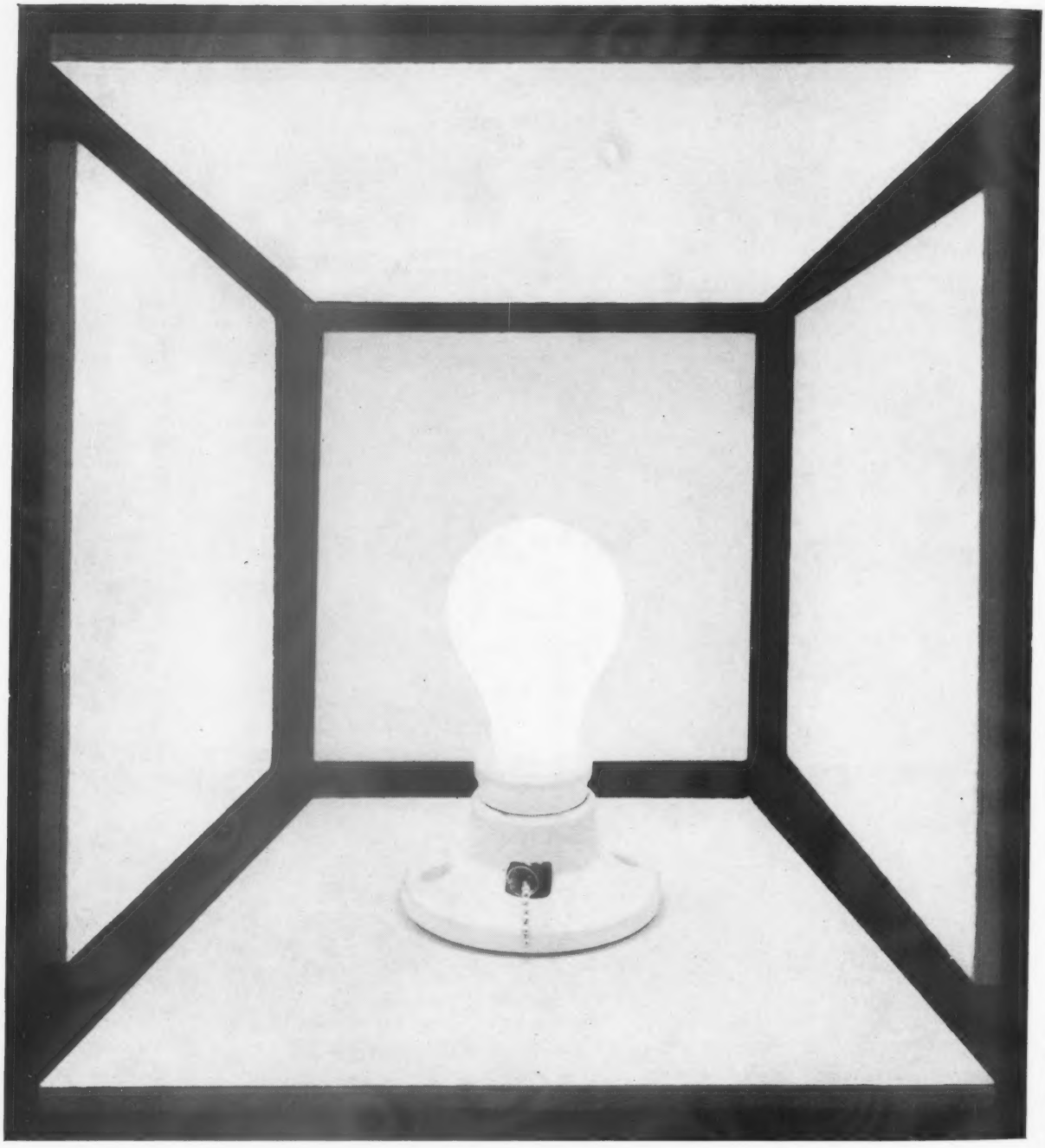

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Advantages and present disadvantages of vinyl emulsion paints for exterior wood, with examples drawn from test house program.

EVALUATING VINYL EMULSION PAINTS

By
John G. Broughton*
and
William S. Sale*

MANUFACTURERS and formulators of trade sales paints have a noisy revolution going on around them this year as proponents of emulsion formulations for exterior wood are proclaiming the long-awaited "miracle" house paints, and vigorous counterclaims are made by producers of competing alkyd and oil systems predicting disaster for the emulsion camp.

The issue is being hotly debated, the battle could still go either way. But not because the excellence of emulsion paints for exterior wood is unproved. The inherent qualities of emulsion paints for exterior wood have been demonstrated by responsible manufacturers and suppliers, who are aware from their test exposure programs that emulsion systems do work well.

Emulsions could lose the battle only by default on either of two counts:

1. *Formulation.* If the emulsion paints are not carefully formulated with thoroughly tested ingredients, they will fall short of their capabilities.
2. *Application.* If label instructions fail in their job of educating professional and amateur painters alike that these new paints require care in substrate preparation, failures will occur.

At Dewey and Almy we consider the achievement of an ideal system for exterior wood the most difficult problem in emulsion paint formulation we have ever tackled. However, if the manufacturer uses recommended instructions, the same excellent results which we have observed for over seven years in our outdoor exposure fences and houses should be easily attainable by professional and amateur alike. We cannot overemphasize the significance of proper formulation and application.

Against this background, this article summarizes our latest, best knowledge about the advantages and present disadvantages of vinyl emulsion paints for exterior wood, with examples drawn from our test house program.

Advantages

Non-Yellowing of White Paints: One of the most striking characteristics of houses painted with white polyvinyl acetate paints is their brilliance and clarity when compared to conventional white-painted structures. This is due to the intrinsic resistance of these films to chemical change.

Bright White: After more than six years, two coats of vinyl emulsion on Barker House, Belmont, Mass., are still a bright white.

*Dewey and Almy Chemical Div., W. R. Grace & Co., Cambridge, Mass.

Dewey and Almy's Barker House in Belmont in Belmont, Massachusetts, a showcase for vinyl copolymer emulsion paint because it is one of the oldest wood exposures, illustrates how white a house remains with these paint. Painted six years ago, it is still a bright white, in contrast to other white houses in the neighborhood. Its finish is still in good condition. (The Barker house was painted in 1954 with two coats of vinyl emulsion paint after the checked and badly chalking old oil surface was scraped and wiped with dry rags.)

Colored Paints: Remarkable ultraviolet resistance accounts for the fact that colored PVAc paints display far less tendency to chalk and fade than do conventional oil paints.

Non-Blistering: The vapor transmission characteristic of polyvinyl acetate finishes makes them ideal for exterior applications where blistering is a possible problem. The fact that water vapor is readily transmitted by these films, whereas liquid water is not, makes them an excellent material for the coating of surfaces where differential vapor pressures are likely to occur.

Quick Drying: Because two coats of polyvinyl acetate paints can be applied in rapid succession, frequently within an hour of each other, the problem of moving staging and ladders is greatly reduced. This appeal should promote their acceptance by professional painters.

Easy Application, Clean-up: These well-established characteristics have accelerated the acceptance of polyvinyl acetate paints for interior use, particularly with the do-it-yourself trade, which now consumes almost 75% of all trade sales paints. The same characteristics are expected to speed the acceptance of polyvinyl acetate exterior finishes.

"Vinyl" — A Merchandising Advantage: In addition to the well known convenience and performance features of emulsion paints, polyvinyl acetate formulations offer a strong, unique advantage: they can be labeled and merchandised as vinyl paints. Consumers recognize the word "vinyl" and, according to a nationwide survey, they associate it with favorable characteristics like beauty and durability.

Problems

What are the problems connected with emulsion paints? They are reviewed below, with our best present solutions indicated:

Flexibility and Distensibility: Wood surfaces are subject to considerably greater changes with temperature and climate than masonry surfaces. Paint films of inadequate flexibility will show early failure by grain checking, a phenomenon which is most pronounced in regions with frequent sharp changes in temperature. The solution to this problem lies in the selection of an emulsion with adequate permanent flexibility. It cannot be too highly emphasized that most vinyl acetate and acrylic copolymers do not appear, from our experience, to have adequate flexibility. However, certain vinyl acetate copolymers (e.g., Everflex BG) have been specifically formulated for a high degree of film flexibility. And like all copolymers, they are internally plasticized; i.e., the plasticizer is part of the molecule and cannot migrate or leach out. These films retain their flexibility under extreme climatic conditions.

Southern Yellow Pine has long been troublesome for paint manufacturers because uneven expansion and contraction of this wood places severe stresses on paint films. Our recommendation for Southern yellow pine is the use of breathing oil-type primer followed by the application of the emulsion finish.

Dimensional Stability and Water Absorption: Laboratory work has demonstrated that emulsion vehicles vary widely in their resistance to water absorption in the film form. Even emulsions which

SUGGESTED LABEL INSTRUCTIONS

Procedure For Painting Of Exterior Wood With Vinyl Emulsion Paints.

1. Paint only when weather conditions are favorable. Temperature should be 40°F. or above. No visible water should be present on the surface. Work on the shady side of structures whenever possible during excessively hot dry weather.
2. Surfaces must be clean and free of dirt, grease and other matter that would affect the paint's adherence.
3. Apply paint generously and uniformly with a full brush. Do not brush out excessively. These paints brush so easily there may be a tendency to brush out too thin a coat. When spraying, thin only with water, approximately one pint/gallon and spray using 30 pounds air pressure. A spray gun with an external nozzle is recommended.
4. Paint may be recoated as soon as the first coat is dry to the touch, usually within 30-40 minutes.

Follow these simple steps below for the type of surface to be painted:

SHINGLES, SIDING AND CLAPBOARDS

Steps—New Unpainted Wood

1. Seal knots with shellac.
2. Prime with a breathing type oil or alkyd primer. In the case of the latter allow 24 hours to dry.
   hours to dry.
3. Putty all nail heads, cracks and points. Caulk if necessary.
4. Apply finish coat E2-BG paint unthinned.

PREVIOUSLY PAINTED

In Good Condition

1. Wash off chalk dust. If detergents are used rinse thoroughly. Wipe off remaining water droplets as you paint.
2. Rough up any excessively glossy areas with steel wool or sand paper.
3. Putty nail holes, cracks and points.
4. Apply finish coat paint unthinned.

In Poor Condition

1. Remove loose scale, flakes, blisters and excessive chalk by wire brushing, scraping, or burning.
2. Seal exposed knots with shellac.
3. Spot prime bare wood areas with a breathing type oil or alkyd primer.
4. Putty all nail heads, cracks and joints.
5. If excessive chalk was not removed in Step 1, apply a coat of penetrating oil primer to entire surface.
6. Apply finish coat of paint unthinned.

METAL SURFACES

Remove rust and dirt, wipe off grease and oil with mineral spirits. Prime bare iron and steel with a corrosion inhibiting alkyd primer. Finish with a coat of the emulsion paint. On clean aluminum or galvanized metal surfaces, no primer is necessary. Apply two coats of finish coats.

have apparent high resistance to so-called "water-spotting" frequently will have an equilibrium water content (after prolonged immersion) as high as 200% of their own weight. While not a direct corollary, it is frequently observed that high equilibrium water content emulsion films show a great tendency to expand. Commercially available emulsions tested in our laboratories have manifested area expansions of from 31% to 65% after two days' immersion in water. Happily, in the same test our own Everflex BG decreased 1%, proving that vinyl films can conquer this disadvantage.

We have had several extreme failures with highly water absorbent homopolymer emulsions which point up the significance of

Water-Absorptive Film: Vinyl acetate homopolymer film failed through expansion and contraction of water-absorptive film in less than a year on Harris House, Arlington, Mass.

this property, particularly on wood houses. Previously painted cedar shingles on Dewey and Almy's Harris test house in Arlington, Massachusetts, were painted with a vinyl acetate homopolymer paint in summer of 1955. The old surface was only slightly chalked. In less than a year, large sheets of paint were flaking off because of expansion and contraction of the water-absorbent film.

Staining: Cedar and redwood are becoming increasingly popular for siding, shingles and shakes. The problem in painting new wood of this type is the presence of water soluble stains in the wood. The water borne paint carries such stains through to the surface, creating an unsightly appearance, particularly in light-colored paint jobs.

Attempts to hold back such stains with ordinary water base primers have not proven effective in our test work. A successful approach has been to insolubilize these stains in the prime coat by applying a special primer containing lead acetate. The lead acetate sequesters the stain in the primer, thereby leaving the top coat unaffected. However, lead acetate is highly toxic. Our recommended approach at this time is the use of a convential breathing, oil-type zinc free primer which permits the escape of some moisture vapor. This solvent-borne finish does not dissolve the stain and the non-blistering characteristic of the emulsion paint is preserved.

Chalking: Our experience with polyvinyl acetate emulsions on previously painted wood has been excellent. Fundamentally, the same problems exist for emulsion finishes as are encountered when previously painted wood is recoated with a conventional oil finish. It is axiomatic among paint chemists that no paint system is any better than its first coat.

A badly chalked wood surface presents somewhat the same problems for emulsion finishes as does a highly chalked masonry surface. Emulsion paints, by their nature, cling more by sheer adhesion than by penetration. If the surface to be painted has a film of chalk, the paint film has nothing to hold to.

Our experience with modified emulsion primers, some of which have been described in advertisements and literature of other emulsion manufacturers, shows that a true solution to this problem has yet to be thoroughly field tested. Our *strongest* recommendation in this case remains the same as in the painting of new wood. To insure against carelessness in the preparation of a substrate, or where there is doubt about the degree of chalking, we recommend the use of a breathing type oil primer over chalky surfaces.

On every job the painter, of course, is faced with a decision: Is the surface chalked enough to require the oil primer? To elimi-

Dispersion:	**lbs./100 gals.**	**Gallons**
Water	50.0	6.00
Tetra Potassium Pyrophosphate	1.0	0.05
Daxad 30, 25% solution	8.0	0.96
Igepal CTA-639	1.0	0.11
Polyglycol P-1200	2.0	0.23
Phenyl Mercuric Borate	0.2	—
3% Methocel HG 4000 cps. soln.	70.0	8.40
Titanox RANC	215.0	6.14
TiPure FF	25.0	0.77
Mica 325 mesh	30.0	1.30
Magnesium Silicate	31.0	1.30
Water	60.0	7.20
Foamicide 581B	1.0	0.15
Reduction:		
Carbitol Acetate } Pre-mix	20.0	2.42
Water } and add	109.6	13.14
Everflex BG (51%)	385.0	43.25
3% Methocel HG 4000 cps. soln.	20.0	2.40
Viscosity Adjustment:		
Water and/or 3% Methocel HG 4000 cps. soln.	51.5	6.18
Total Yield	1080.3	100.00

Directions:

1. Combine the first 11 items in a change can mixer, and mix until a smooth homogeneous paste is formed.
2. Add the remaining water and Foamicide to the mixer, and give the mixture one pass through a high speed stone mill.
3. The materials used in the reduction are added to the dispersion in the order given with good agitation.

Physical Constants

Pounds per gallon	10.8
Pigment Volume Concentration	32%
Total Solids	46.2%
Pigment Solids	27.9%
Viscosity	75 ± 5 KU

Formula No. E2-BG. White exterior paint based on Everflex BG. Raw material cost about $1.62 per gallon.

Recoat Over Shingles: Tarbox House, Caldwell, N. J., shows that if old oil paint is in good condition, it can be recoated directly with vinyl emulsion paint without preparation. This exposure is 4½ years old.

Recoat Over Clapboards: Miller House, Prides Crossing, Mass., exposed to ocean storms for 5 years with its vinyl emulsion over old oil, is in fine condition.

Color Retention: Hansen House, Wheaton, Ill., painted green five years ago with vinyl emulsion paint, show almost no color fade.

nate this arbitrary choice by the painter, and to eliminate the effort and time needed to apply a separate oil primer, we suggest a conditioner which is to be sold separately but mixed directly into the first emulsion coat in a proportion of from 20% to 25% by volume. While our exposure history on this system is less than on unmodified paints we believe we have sufficient evidence to prove good results.

This additive is easily emulsified by hand stirring into the vinyl emulsion paint. When this system is used, the oils in the first emulsion coat are protected from ultra-violet degradation by the top emulsion coat.

We have had excellent experience without primers or additives in cases where chalky wooden surfaces have been carefully wire-brushed prior to painting. No further treatment has been given. In these cases, or when the old paint is found to be sound and free from chalking and peeling, two coats of emulsion paint may be safely applied directly over the old finish, with excellent results.

For instance, the old oil paint over cedar shingles on the Tarbox House, Caldwell, New Jersey, was in good condition when it was recoated directly with two coats of slate blue vinyl emulsion paint in May, 1955. Today the surface is in very good condition, and owners have requested the same paint for future use.

Vinyl emulsion paints are equally satisfactory over clapboards. Old oil paint on the Miller House, Prides Crossing, Massachusetts, overlooking the Atlantic Ocean, was in fair, slightly chalked, condition in July, 1955, when it was painted with two coats of antique coral vinyl emulsion paint after no preparation other than sanding of some slight blistering. Today the finish is lightly chalking but still in fine condition.

Consolidation at Low Temperatures: Wood houses are most popular in northern parts of the country. There, painting is commonly done in the spring and fall at which time temperatures may be far from ideal. In our opinion, any emulsion selected for exterior wood house painting should be safe for exterior application in temperatures at least down to 40°F. Such emulsions are now available.

Color Retention: This characteristic of a finish paint is strikingly affected by the choice of the emulsion. Some films undergo major chemical changes on exposure to oxygen and ultra-violet light which accelerate their rate of chalking and limit the protection of the pigment.

Many of the desirable sales advantages of emulsion paints are lost if the paints have this weakness. This is particularly true today when householders are choosing from a wide range of colors ranging from deep shades to light pastels. In our tests some vinyl films have demonstrated ultra-violet resistance superior to any other type.

The Hansen House in Wheaton, Illinois, is a good example of good color retention. Its cedar clapboards were painted in September, 1955, with two coats of green paint over an oil base primer. Today, five years later, the green shows only very slight chalk and

almost no color fade. Dirt collection is slight and is easily cleaned off with a garden hose. The surface has retained most of the pleasing low luster associated with vinyl paints.

Formulation

These remaining "problems", if they can be termed that, are problems only if the manufacturer and painter make them so. Proper selection of ingredients eliminates most of the problems, and the rest are banished by proper application. Because ingredient selection is so important, we offer here some basic recommendations for vinyl emulsion paint formulation:

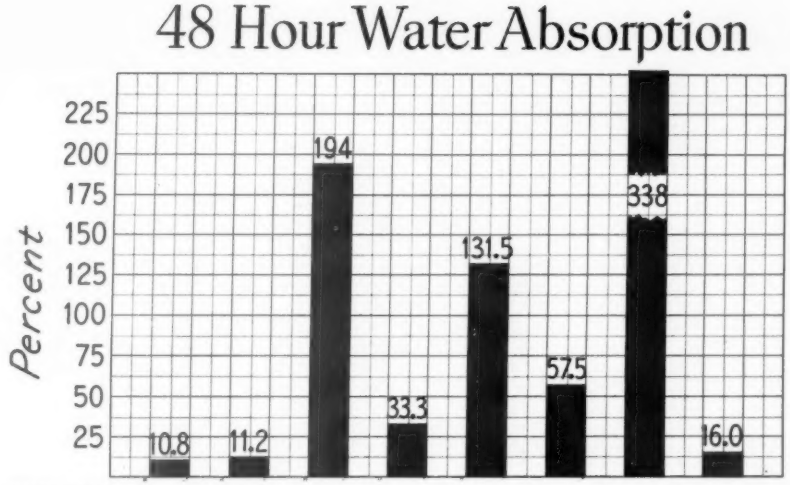
Emulsion Selection: Our own test work has indicated that vinyl acetate copolymers are now in existence which are satisfactory vehicles for exterior wood from the standpoints of low water absorption, flexibility, tint retention and low temperature film consolidation. At Dewey and Almy these copolymers are formulated with approximately 40% of a highly flexible comonomer. Their combination of high molecular weight and unique gel and sol properties (indications of the degree of cross linking) contribute to this unusual combination of characteristics.

White Pigment Selection: For tint bases, non-chalking rutile titanium dioxide is recommended. In the case of whites where a degree of chalking is desirable, portions of the rutile TiO_2 may be replaced by the anatase type.

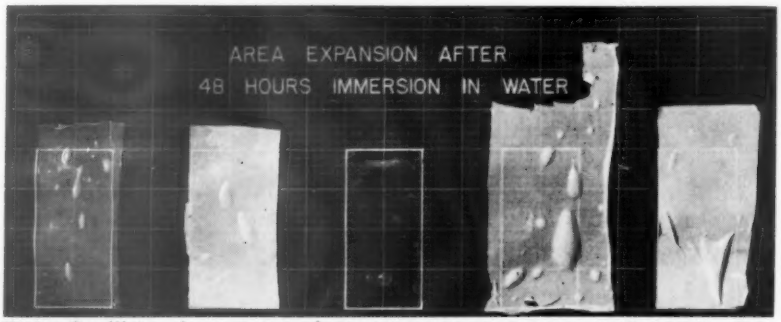
Extender Pigments: Mica is recommended in exterior vinyl acetate emulsion formulations to provide additional multiple-foci release points for stresses and strains. Magnesium silicates used as extenders seem to give the best compromise between tint-retentive properties and freedom from metallic staining.

Thickening Agents: From our experience, Methocel HG65 (4000 cps) is recommended as it appears to provide uniform hold-out of paint over porous surfaces.

Surfactant Selection: A combination of an anionic dispersant such as Daxad 30, and a nonionic surfactant such as Igepal CTA 639 has proved excellent in our exposure work. This combination also provides good color development and package stability.



Water Absorption: Degree to which several common emulsions absorb water is shown on chart which records weight increases for eight different emulsion films after two days' immersion in water.



Water Swelling: Importance of selecting proper emulsion is strikingly illustrated by five emulsion films placed in tray of water, then photographed after two days. They vary widely in their expansion from water absorption.

While our experience is limited, we recommend caution in the use of water-dispersible lecithin as it appears to cause loss of adhesion or inter-coat failure when an emulsion paint is applied over an oil base paint.

Untried surfactants should be avoided until several years of exposure experience have proven them satisfactory for this type of finish.

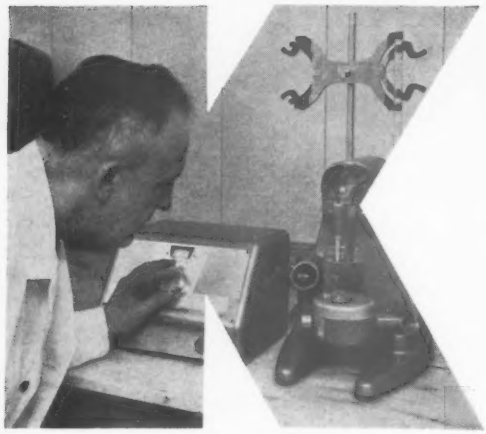
Mildewicides: While wood self-primed with polyvinyl acetate paints does not support the growth of mildew, experience has indicated that mildew spores can obtain nourishment for growth through a PVAc emulsion film from underlying conventional oil based paints or primers. In our experience, adequate formulation demands the incorporation of sufficient quantities of phenyl mercuric acetate or other mildewicides.

Consolidating Agents: Carbitol Acetate or Butyl Cellosolve Acetate are excellent consolidating agents for polyvinyl acetate paints.

Freeze-Thaw Resistance: Ethylene Glycol can be used without harming paint properties where freeze-thaw resistance is desired.

Pigment Volume Concentration: Our recommendation is to keep PVC between 30 and 35 per cent. In order to apply a sufficiently heavy coat, it is recommended that the total solids be kept as high as possible consistent with good application characteristics. Our experience indicates that 50% total solids is practical.

Choice of Color Pigments: In formulating an exterior emulsion paint suitable for both wood and masonry, only alkali-stable colors should be used. The following list suggests those most suitable for this type of paint: Phthalocyanine Blue, Phthalocyanine Green, Hansa Yellow 10-G, Nickel Titanate, Yellow Iron Oxide, Red Iron Oxide, Black Iron Oxide and Carbon Black.



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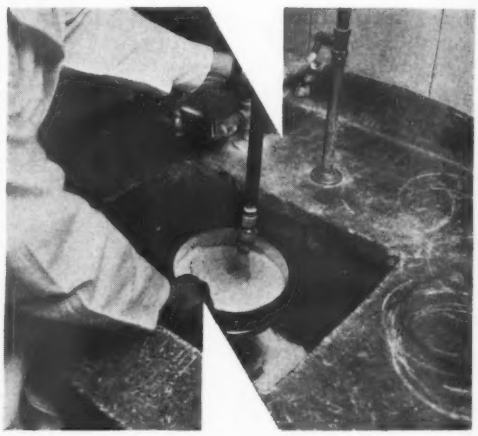
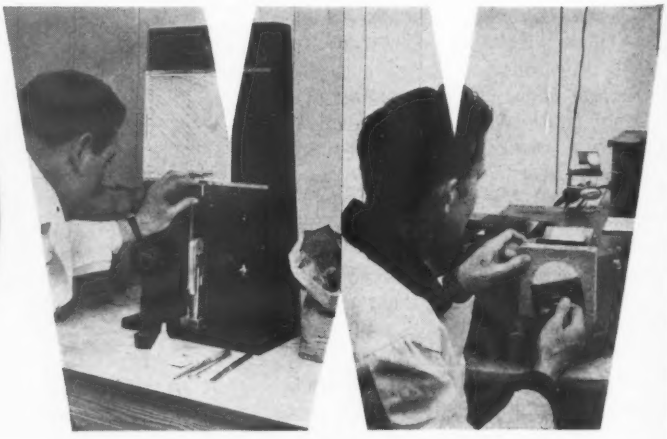


☛ *Plants in Tate, Georgia and Wingdale, New York*



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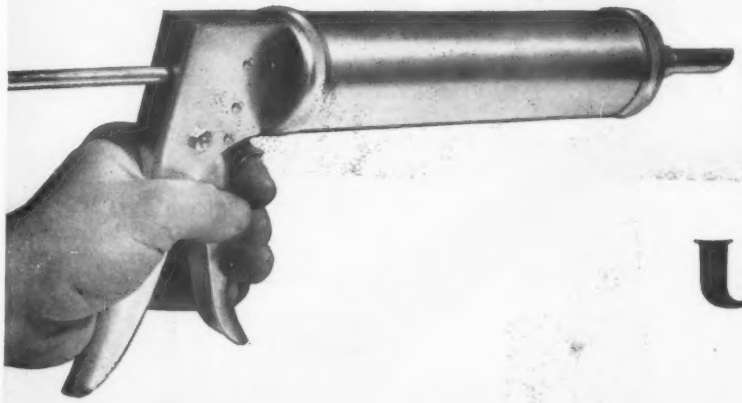

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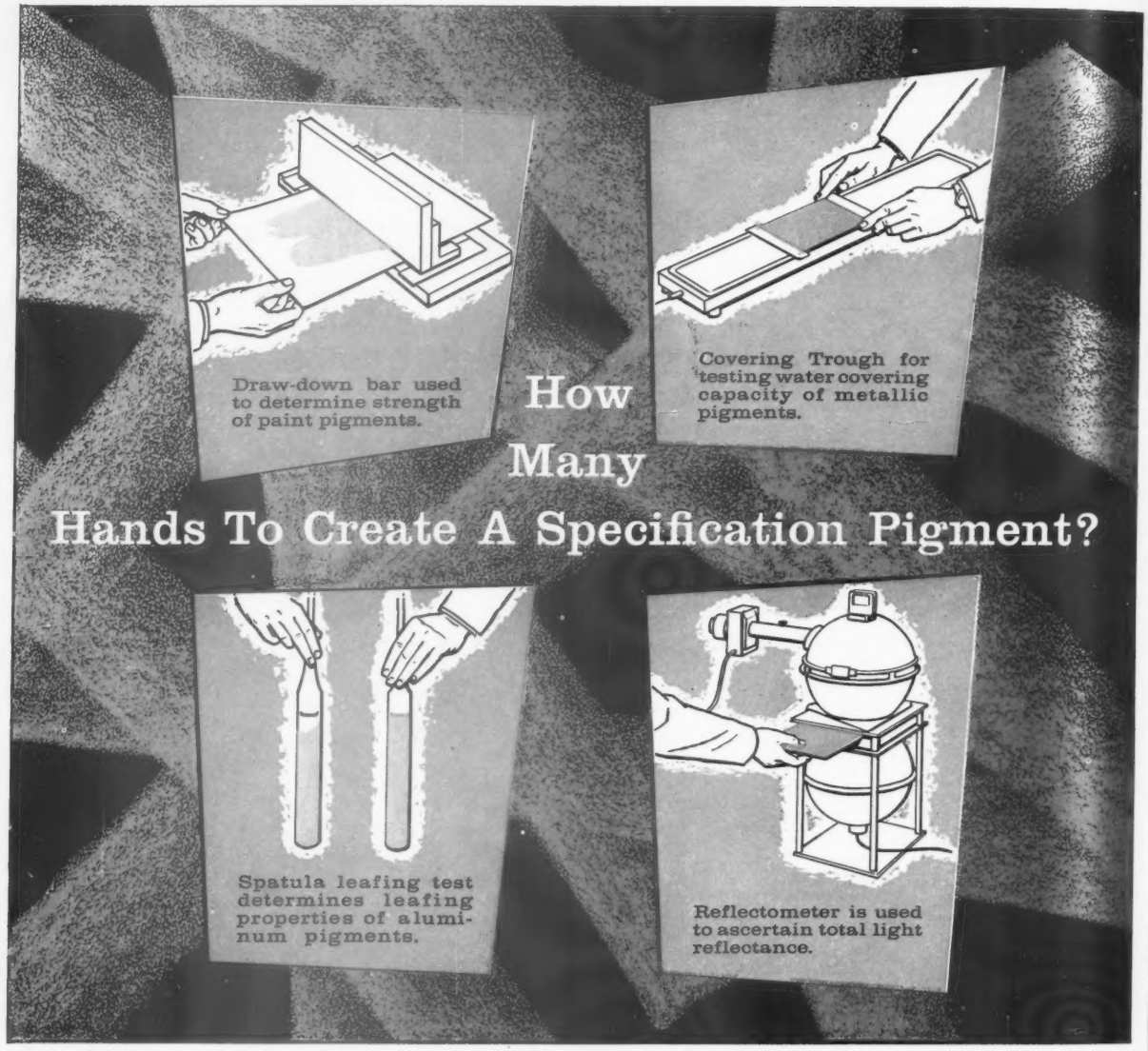

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A summary of extensive exposure tests of polyvinyl acetate exterior paints for new wood and repaint applications.

EXPOSURE RESULTS OF POLYVINYL ACETATE EMULSION PAINTS

By
R. S. Seidel*
and
H. P. Beardsley**

EXTERIOR paints based on polyvinyl acetate (PVA) emulsion have been produced in commercial quantities in the United States since the early fifties. These paints have been sold primarily for use on masonry substrates such as stucco, concrete block, brick, and asbestos-cement shingles. Customer acceptance of exterior PVA paints was good because these paints had the following outstanding properties:

- Excellent application properties
- Quick drying to minimize insect damage
- Easy clean-up of brushes and equipment
- No dirt collection
- Superior appearance, long-lasting cleanliness
- Mildew resistance
- Outstanding film durability
- Blister resistance

Recently, polyvinyl acetate emulsion paints have been introduced for use on exterior wood. Since there is widespread interest in this application, we are summarizing in this paper the results of our extensive exposure tests with paints based on "Elvacet"[1] polyvinyl acetate emulsions.

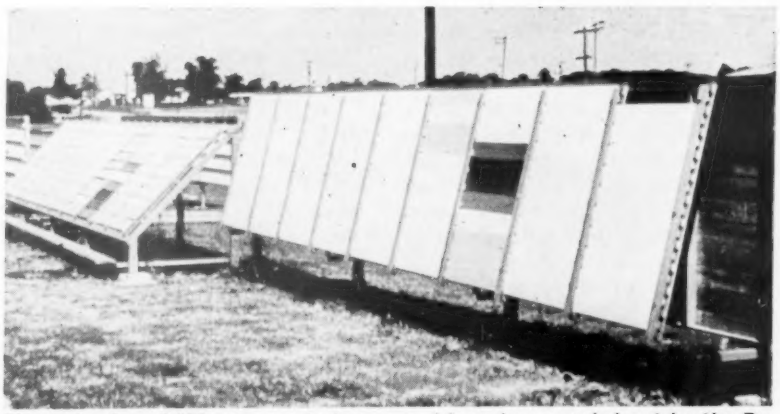

Figure 1. Over 5,000 exposure tests on wood have been carried out by the Du Pont Electrochemicals Department. Panels are exposed in both vertical and 45° south positions.

The Electrochemicals Department of the Du Pont Company has carried out over 5,000 exposure tests on wood, using approximately 1,000 different formulations. These tests have been made on various types of wood with the "Elvacet" base paints applied directly to the bare wood and also over various types of primers. Systematic variations of the formulations were made in order to determine the effect of each type of ingredient on durability. Tests have been confirmed on buildings.

Painting New Wood

Twenty-six different paints based on large particle size "Elvacet" polyvinyl acetate homopolymer emulsions have been exposed for 7-8 years on red cedar. Many of these exposure panels are still in excellent condition. In these exposures, slight cracking occurred with polyvinyl acetate homopolymer paints pigmented with only titanium dioxide. Cracking was eliminated when 0.3-0.6 lb./gal. of mica was included in the formulation. After 7 years' exposure, paints containing equal parts of rutile titanium dioxide and free-chalking anatase titanium dioxide have eroded to the wood but the

* Service Manager, Vinyl Products Division, Electrochemicals Department, E. I. du Pont de Nemours & Company, Wilmington 98, Delaware.

** Technical Representative, Vinyl Products Division, Electrochemicals Department, E. I. du Pont de Nemours & Company, Wilmington 98, Delaware.

(1) "Elvacet" is Du Pont's registered trademark for its polyvinyl acetate.

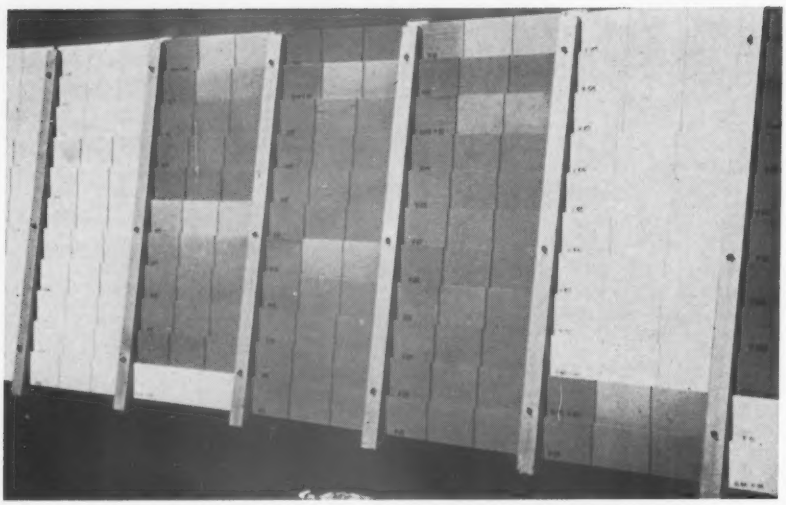

Figure 2. Systematic variations in the formulation of paints based on "Elvacet" have been made to determine the effect of each ingredient on durability. The paints are applied directly to wood and over various primers.

paints containing only chalk-resistant rutile titanium dioxide are in good condition. Modification with 15% alkyd resin based on the polyvinyl acetate did not affect durability.

There are 74 different formulations of paints based on "Elvacet" 81-900 (a large particle size PVA homopolymer) which have been exposed on red cedar since January 1954 in both south vertical and north vertical positions in Delaware. Variables investigated include grade of titanium dioxide, colored pigments, type and amount of extender pigments, pigment volume concentration, coalescing agents, plasticizers, mildew inhibitors, dispersing agents, and corrosion inhibitors. Many of these paints formulated at 20%-30% PVC are still in excellent condition and, compared with conventional oil paints, show superior tint retention, mildew resistance, and film durability.

In the above series of "Elvacet" 81-900 homopolymer base paints exposed in January 1954, it was found that extender pigments such as mica, clay, diatomaceous silica, or talc improved the durability on red cedar. There was little difference in results between these various extenders. Film durability decreased as the pigment volume concentration was raised. Use of 10% free-chalking anatase titanium dioxide with 90% chalk-resistant rutile titanium dioxide in white "Elvacet" 81-900 base paints formulated at 27%-30% PVC caused mild chalking resulting in clean white paints. A minimum of 15% plasticizer based on the resin was found to be necessary with this emulsion for optimum durability. Dibutyl phthalate is used in the suggested formulations based on "Elvacet" 81-900. Later tests with "Elvacet" 1440 polyvinyl acetate homopolymer emulsion have shown that tricresyl phosphate provides better tint retention than dibutyl phthalate. Without a preservative, mildew occurred on these paints exposed on wood in Delaware; however, phenyl mercury oleate (0.01-0.02 lb./gal.) gave satisfactory protection. Other phenyl mercuric salts may be preferred because of their ease of dispersion in emulsion paints. No difference in durability on wood was observed between nonionic, anionic, and cationic surface active agents. Incorporation of sodium benzoate (0.02-0.1 lb./gal.) as a corrosion inhibitor in the paint did not affect durability on wood.

On new red cedar, staining due to leaching of water-soluble dyestuffs from the wood often occurs when any water-thinned paint is applied to the bare wood. This staining usually disappears after a few months' weathering but is meantime very unsightly. Priming of the red cedar with a linseed oil or an alkyd primer generally eliminates the staining. "Elvacet" 81-900 base paints of 27% PVC have shown good performance on red cedar primed with linseed oil in exposure tests of six years' duration.

Excellent durability has also been obtained with 30%-35% PVC paints based on "Elvacet" 1423 polyvinyl acetate copolymer emulsion on both self-primed and linseed oil-primed red cedar. Exposure tests on wood with paints based on this emulsion have been

EXTERIOR PAINTS BASED ON "ELVACET" 1423

Suggested Formulas E-1056 and E-1057

Ingredients	Lb./100 Gal. White E-1056	Lb./100 Gal. Tint-Base E-1057
Pigment Grind (High Speed Mill)		
Water	135	135
"Daxad" 30 dispersing agent	5	5
Mica, 325 mesh, waterground	30	30
"Nytal" 300 talc	61	98
"Ti-Pure" R-610 titanium dioxide	200	200
"Ti-Pure" FF titanium dioxide	50	—
Reduction		
"Cellosize" WP-4400 hydroxyethyl cellulose, 2% solution	150	150
Propylene glycol monococate C antifoamer	2	2
"Witco" 912 wetting agent	4	4
Water	96	96
"Carbitol" diethylene glycol monoethyl ether	30	30
"Elvacet" 1423 polyvinyl acetate copolymer emulsion	344	341
"Igepal" CA-630 wetting agent	2	2
"Bufen" 30 phenyl mercury acetate solution	4	4
Paint Properties		
Total Volume	100 gal.	100 gal.
Pounds/gallon	11.1	11.0
Pigment volume concentration	35%	35%
Nonvolatiles	48.8%	48.2%
Consistency, Krebs Units (approximate)	73-78	70-75
pH	6-7	6-7

carried out since September 1956. These latex paints show less water spotting and better tint retention and mildew resistance compared to conventional oil paints. Best results are obtained on red cedar when it is primed with a linseed oil or alkyd primer to eliminate cedar staining. Topcoats similar to formulations E-1056 and E-1057 which are listed at the end of this paper have given good results over such primers.

With "Elvacet" 1423 base paints applied directly to red cedar, better film durability has been obtained with mica, talc, clay, or diatomaceous silica than with calcium carbonate and calcium silicate. With the latter two extenders, cracking occurred along the grain of the wood. However, over linseed oil primer, there was no difference in film integrity between the various extenders. Paints containing calcium carbonate and calcium silicate had slightly better tint retention than paints containing the talc. Poorest tint retention was obtained with paints containing mica or clay as the sole extender. In general, on red cedar "Elvacet" base paints had better tint retention when self-primed rather than applied over a linseed oil primer. In the suggested formulas E-1056 and E-1057, a mixture of talc and a small amount (0.30 lb./gal.) of mica is used as the extender system.

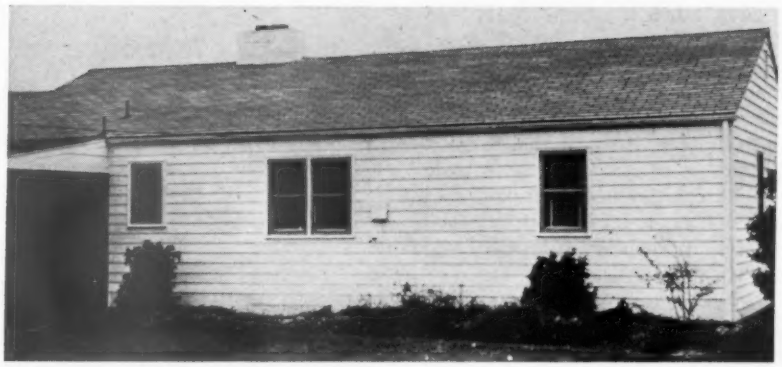

Figure 3. Excellent blister resistance under adverse moisture conditions is obtained with properly applied "Elvacet" base paints on houses constructed of wood clapboard.

Paints based on "Elvacet" 1423 have a much slower chalking rate and hence better tint retention than "Elvacet" 81-900 base paints. In white paints based on "Elvacet" 1423 which are formulated at 30%-35% PVC, it is suggested that 10%-20% of the titanium dioxide be a free-chalking anatase type to obtain optimum whiteness and cleanliness. In southern areas of the country, less of the anatase titanium dioxide is required.

No difference in durability occurred on self-primed or linseed oil-primed red cedar with "Elvacet" 1423 base paints containing various fusion agents such as diethylene glycol monoethyl ether, diethylene glycol monoethyl ether acetate, ethylene glycol monobutyl ether acetate, hexylene glycol, or dibutyl phthalate applied at normal temperatures. At low temperatures (38°-40°F.), the more water-insoluble coalescing agents, such as ethylene glycol monobutyl ether acetate and dibutyl phthalate, produced better film formation, but these materials sometimes affect freeze-thaw stability adversely.

On southern yellow pine, self-primed paints based on polyvinyl acetate emulsions formulated at 30% or higher pigment volume concentration have shown rather poor durability after exposure at 45° south. Cracking of the wood often occurred. Reducing the pigment volume concentration to about 20%-25% improved the durability on yellow pine. Better results have been obtained with self-primed paints based on "Elvacet" 81-900, such as Formulas E-188 and E-189 listed at the end of this article, than with other polyvinyl acetate emulsions including copolymers such as "Elvacet" 1423. Priming of the yellow pine with linseed oil permits the use of higher PVC paints based on either grade of "Elvacet".

Based on results obtained in extensive testing, it is concluded that the best method for painting new wood with "Elvacet" base paints is to use a blister-resistant linseed oil or alkyd resin primer. Such priming overcomes staining on red cedar and reduces cracking of southern yellow pine.

EXTERIOR PAINTS BASED ON "ELVACET" 81-900

Suggested Formulas E-188 and E-189

Ingredients	Lb./100 Gal. White E-188	Lb./100 Gal. Tint-Base E-189
Pigment Grind (High Speed Mill)		
Water	20	20
"Polyglycol" P-1200 polypropylene glycol	2	2
"Tamol" 731 dispersing agent, 25% aqueous solution	5.6	5
"Emulphor" EL-719 dispersing and wetting agent	3	3
"Carbitol" diethylene glycol monoethyl ether	35	35
Dibutyl phthalate	30	30
Mica, 325 mesh, waterground	30	30
"Ti-Pure" FF titanium dioxide	25	—
"Ti-Pure" R-610 titanium dioxide	225	200
Water	60	45
Reduction		
"Methocel" 4000 methyl cellulose, 2% aqueous solution	160	200
Water	49	37
"Elvacet" 81-900 polyvinyl acetate emulsion	360	360
"Nildew" AC phenyl mercury acetate, 10% solution	15	15
Water	60	60
Properties		
Total Volume	100 gal.	100 gal.
Pounds/gallon	10.7	10.4
Pigment volume concentration	27%	23%
Consistency, Krebs Units (approximate)	80-85	80-85
pH	6-8	6-8

Repainting

Over previously painted wood, "Elvacet" base paint can be applied if the old paint is in good condition, is not chalky or glossy,

and is adhering firmly. If the paint is chalky but otherwise in good condition, a first coat of special tung oil or alkyd resin reduction developed by our laboratories is suggested. If the oil paint is cracked, blistered, or flaked, the loose paint should be removed and a first coat of linseed oil or alkyd primer applied before the "Elvacet" base topcoat.

Chalky Surfaces

Excellent results on both panels and test houses have been obtained with "Elvacet" base paints applied over conventional oil paints in good condition, i.e., only slightly chalky, nonglossy, fairly clean, and

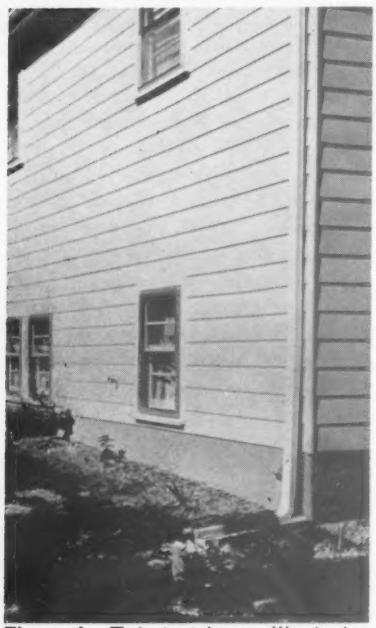

Figure 4. This test house illustrates that paints based on "Elvacet" 1423 have good adhesion to weathered linseed oil paints which are not chalky.

adhering well. The Electrochemicals Department recognized many years ago that such surfaces would seldom be repainted and that the problem of applying an "Elvacet" base paint to chalky surfaces must be solved before widespread use would be realized.

Tests showed that solvent-thinned surface conditioners containing alkyd resins or tung oil tied down loose chalk and generally gave satisfactory performance when a topcoat of "Elvacet" base paints was used. However, this system was admittedly a compromise and detracted from the advantage of an all water-thinned system. Accordingly, the effect of adding tung oil or alkyd resins to the first coat of "Elvacet" base paint was investigated. Results of exposure tests to date indicate that this technique offers great promise as a solution to the problem of repainting chalky surfaces.

Table I

TUNG OIL REDUCTION FORMULATION

Ingredients	Pounds
Raw tung oil	100
"Aerosol" OT dioctyl ester of sodium sulfosuccinic acid, 75% (American Cyanamid Company)	2.6
Cobalt naphthenate solution 6% Co	0.1
"Activ" 8 1,10-phenanthroline solution, 38% by weight (R. T. Vanderbilt Co., Inc.)	0.2

It is suggested that one quart of the tung oil formulation shown in Table I be added to one gallon of a 35% PVC paint based on "Elvacet" 1423. Exterior paint formulations E-1056 and E-1057 are suggested for evaluation, modified with tung oil for the first coat and unmodified for the topcoat.

The suggested tung oil reducer can be easily mixed with the "Elvacet" base paint by hand stirring. Thus, a painter can make the modification on the job. On the other hand, tung oil-modified paints can be produced by the paint manufacturer if desirable. These paints have shown good stability for over a year with regard to change in consistency.

Some color changes have been observed when the oil was added to colored paints containing colored organic pigments. This may have been caused by migration of the colored pigment into the oil phase.

Wood panels exposed in 1959 were painted with the above system have shown excessive mildew and/or dirt collection. This has not occurred on the chalky masonry panels exposed at the same time or on older wood panels. The mildew problem in 1959 in Wilmington, Delaware, appeared to be more severe than in previous years which might explain these results. On the other hand, it may be necessary to add mildewcide to the tung oil reducing agent. Evaluation of 0.5% phenyl mercury oleate based on the tung oil is suggested.

The major difficulties encountered in the past with alkyd reducing agents have been poorer dispersibility and alkali resistance over masonry paints. In the 1959 exposure tests, however, the alkyd-reduced paints on wood were cleaner than the tung oil-reduced ones. This indicates that alkyds may be preferred for reducing "Elvacet" base paints to be applied to chalky wood surfaces.

It is suggested that one quart of the alkyd formulation shown in Table II be added to one gallon of a 35% PVC paint based on "Elvacet" 1423. Exterior paint formulations E-1056 and E-1057 are suggested for evaluation, modified with alkyd for the first coat and unmodified for the topcoat.

Alkyd first coat reductions of "Elvacet" base paints have been exposed on chalky masonry surfaces for over four years with good adhesion and durability. The suggested alkyd reducer has been exposed on wood over chalky oil paints since September 1959.

The suggested alkyd reducer in Table II is prepared by combining the materials in the order listed with agitation to form an emulsion. This alkyd emulsion is added to the polyvinyl acetate emulsion base paint. "Elvacet" emulsion base paints containing this reducer have shown excellent consistency stability after storage for six months.

Problem Surfaces

Our exposure tests show that "Elvacet" base paints do not solve all the repainting problems. For

(*Turn to page 133*)

Table II

ALKYD REDUCTION FORMULATION

Ingredients	Pounds
"Dyal" XAD-116 alkyd resin solution, 90% (Sherwin-Williams Company)	100
Cobalt naphthenate solution, 6% Co	1.3
"Igepal" CA-630 (Antara Chemicals)	15
Water	72
Ammonium hydroxide, 28%	0.8

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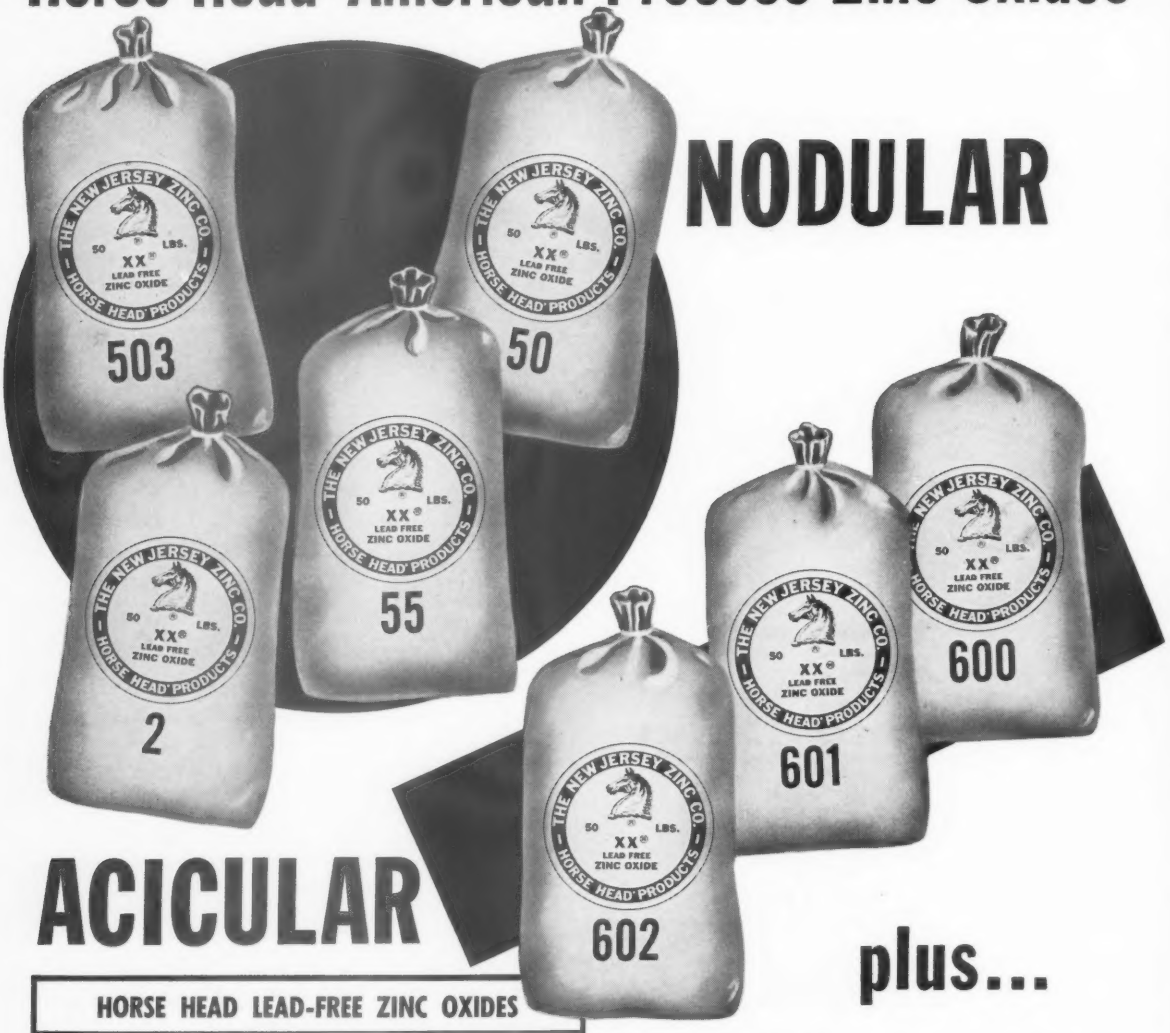

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XX-2	Fine	Nodular	130
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Based on seven-year exposure test program, acrylic formulations with 30-35 percent PVC exhibit best performance.

ACRYLIC EMULSION PAINT FOR WOOD

By
Gerould Allyn*

IN the last two years acrylic emulsion paints for exterior wood surfaces have had widespread acceptance. While it is too early to assess the final outcome of this development, most of the major paint companies now have on the market an emulsion painting system for exterior wood surfaces. The majority of these systems use acrylic emulsions.

Despite the comparatively recent introduction of acrylic emulsion paints for use on wood, long term test work has been conducted on these systems. Our own test program, for example, goes back to 1953. This program has utilized several thousand test panels and many test buildings in different climates.

Long service life, lasting beauty, and excellent resistance to blistering can be expected from acrylic emulsion paint systems on wood surfaces if the application procedures recommended by their manufacturers are followed.

Introduction of the new acrylic emulsion paint systems for wood has been accelerated by the blistering and peeling problems which have been encountered in the past when some types of oil based paints are used. This blistering problem has been caused in part by the tendency in recent years to build small tightly sealed homes. Also for many years, changes in oil paint formulations were in the direction of increased sensitivity to moisture.

Advantages

There are a number of reasons why acrylic emulsion painting systems have rapidly become popular for the painting of exterior wood. These are summarized in the following:

1. Reduced blistering. Properly formulated acrylic emulsion paint films have relatively low rates of swelling when immersed in water. Work by F. L. Browne of the Forest Products Laboratory has demonstrated that paint systems with relatively low swelling rates in water have the best chance of resisting blistering when used on wood surfaces. It is necessary, of course, to use a blister-resistant primer in order to get a highly blister-resistant paint system.

2. Good resistance to cracking and checking. Both paint films and wood, when subjected to changes in temperature or moisture, undergo changes in their dimensions. Changes in dimensions of acrylic paint films come somewhat closer to those of wood than many other types of films, particularly linseed oil films containing zinc oxide. The polymer in acrylic emulsion paints forms tough, flexible films and these films retain the major portion of their flexibility and elongation on aging. Consequently, properly applied acrylic emulsion paints have excellent resistance to cracking and checking on wood surfaces. The acrylic paints also have exceptionally good adhesion to previously painted surfaces. This property has been confirmed in a great many commercial applications.

3. Outstanding resistance to weathering and to degradation by ultraviolet light. The acrylic family of polymers gives good resistance to degradation by oxygen and ultraviolet light. While there is some reduction in elongation and an increase in tensile strength, repeated studies have shown that acrylic systems resist degradation extremely well. For example, clear films of acrylic emulsion, exposed for 100 hours in a Fadeometer, show an elongation of 447% initially and 429% after exposure. Tensile strength increased from 2126 p.s.i. to 2683 p.s.i. Other types of clear films show much greater reduction in elongation and a much greater change in tensile strength than this. Some increase in strength, and some degrade severely. After

*Rohm & Haas Co., Philadelphia, Pa.

Figure 1
Structure: Wood Clapboard Home
Location: Los Angeles, California
Construction: Redwood siding
Area Painted: Exterior walls, trim and galvanized gutters
Original Condition of Surface: Old oil paint in good condition
Surface Preparation: None
Date Painted: August, 1953
Method of Application: Brush
Number of Coats: Two
Color: Siding white-Shutters green
Present Condition: Extremely good color retention and adhesion to previously painted oil surface. Very clear and white, mild chalking. No blistering or peeling, color retention good on shutters and adhesion to galvanized excellent.
Comments: Redwood siding is an excellent siding since it is resistant to grain checking and cracking. Oil paint must be used as first coat to prevent bleeding of redwood stain.

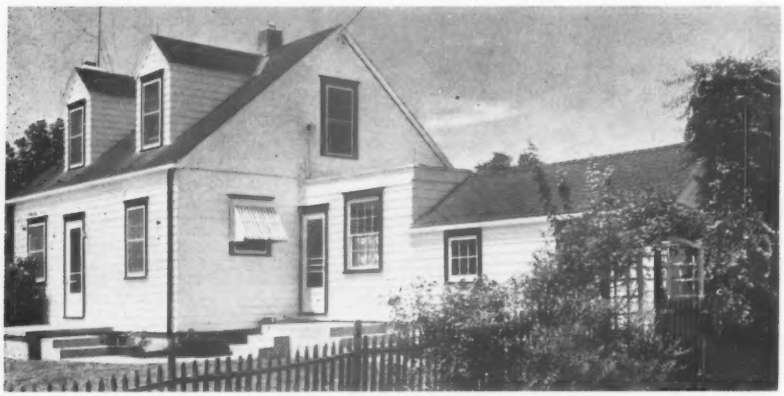

Figure 2
Structure: Clapboard Test House with Picket Fence in Foreground
Location: Philadelphia, Pennsylvania area
Construction: Pine clapboards
Area Painted: Exterior walls and trim
Original Condition of Surface: Old oil paint
Surface Preparation: Dusted
Date Painted: September 1953
Method of Application: Brush
Number of Coats: Two on original paint job
Color: White
Present Condition: Photo shows present condition. Four years after original painting, surfaces were burned and scraped to bare wood, oil primer applied and two topcoats of acrylic emulsion paint. Original job showed some blistering due to high moisture content in house but general condition prior to repainting was good. Excellent adhesion has been shown on this repaint work.

3000 hours Fadeometer exposure, the acrylic films are still clear, tough, and flexible while most other types of films have yellowed, cracked, and checked.

The acrylic paints also show excellent color retention and retain their whiteness or tinted appearance very well on aging.

4. Application to damp surfaces. The acrylic emulsion paints, along with other emulsion systems, can be applied in damp weather. Since emulsion paints themselves are thinned with water, no time need be lost in waiting for wood surfaces, wet by rain or dew, to dry out.

5. Easy application. Acrylic emulsion paints are easy to apply. There is a characteristic absence of brush drag typical of emulsion systems. However, this is also a disadvantage because there is often a tendency to apply too little paint. The manufacturer should give a recommended spreading rate and instruct users to adhere to this spreading rate for maximum durability.

6. Easy brush clean up. It is easy to clean brushes when emulsion paints are used because they can be washed in water.

7. Fast drying speed. If two coats of acrylic emulsion paint are to be applied, the second coat can be put on thirty minutes to an hour after the first coat. This gives considerable savings in time as one scaffold setting will take care of both coats. This quick drying also reduces the problem of bug and dirt collection characteristic of drying paints.

Painting on Bare Wood

Observations on test panels and houses indicate that acrylic emulsion paints will do their best job when they are applied over a primer on bare wood or burned-off wood. An oil or alkyd primer is needed to reduce the moisture transmission in and out of the wood surface. Unless this is done, premature grain raising, warping, and cupping, or bleed-through of color will occur.

There have been a number of attempts to produce all water systems for wood comprising a water based primer and a water based topcoat. However, these have met with only moderate success. Perhaps the most successful of these have been emulsified alkyd or oil prime coats followed by acrylic emulsion topcoats. However, our exposure work indicates that the best results will be obtained with a conventional blister-resistant oil based primer followed by two acrylic emulsion topcoats.

Primers without zinc oxide show minimum swelling and give good blister resistance. One satisfactory

primer for use under acrylic emulsion paints is described in Federal Specification TT-P-25A. A primer of this sort should be allowed to dry for two or three days before the acrylic topcoat is applied. If two coats of acrylic paint are desired over the primer, the second coat can be applied within an hour after the first.

Incidentally, the first outdoor exposure tests on acrylic emulsion paints were conducted on yellow pine surfaces without oil priming. These tests were started in 1953, and some of these panels are still in good shape on the test fences after seven years of exposure. However, as indicated above, in commercial applications an oil primer should always be used for consistently good results.

Use on Previously Painted Wood

Previously painted wood surfaces present a variety of surface conditions that can affect the topcoats. If the underlying coating is cracking, flaking, peeling, or blistering, it is essential to burn off the old paint, prime, and apply one or two topcoats.

Chalking of old paint is a condition which also must be considered. Test results to date indicate that if moderate chalking is present, the surface to be coated can be washed down with a hose and then the topcoats applied. However, if the surface is chalking heavily, then the chalk should be washed off and the surface allowed to dry. An oil base prime coat should then be applied, and this should be followed by one or two topcoats of acrylic emulsion paint.

Application Conditions

The usual requirements covering the application of paints on exterior surfaces also apply to acrylic emulsion paints. It is necessary to brush on a film of suitable thickness using the recommended spreading rate. Cleaning of the surface should be thorough or early peeling may result.

In hot dry weather it is advisable to dampen the surfaces before painting. This helps to cool the surface and adds a small amount of water which prevents excessively rapid drying of the paint.

Acrylic emulsion paints should not be applied at low temperatures.

Figure 3
Structure: Wood Shingle House
Location: Philadelphia, Pa., area
Construction: Cedar shakes (rough shingles)
Areas Painted: Cedar shakes
Original Condition of Surface: Brown stain, 4 years old
Surface Preparation: None
Date Painted: September, 1956
Method of Application: Brush
Number of Coats: One
Color: Barn Red
Present Condition: Excellent, no signs of chalking or blistering
Comments: Good results are being obtained with acrylic emulsion paints on wood shingles. However in whites and light tints, the surface should first be sealed with oil paint to prevent bleed-through of cedar stains. This is not true of darker colors.

The particular temperature depends on the formulation of the paints but a safe guide generally is a minimum temperature of 50°F.

In cases where acrylic emulsion paints are to be applied over old oil paint films that have aged in protected areas, it is essential to wash down the surface of the oil paint film. There are some indications that clear water is at least as effective and in many cases better than the use of water with detergents added. Soaps should be avoided since they leave a water repellent residue.

It is helpful to reduce the gloss of the oil paint system either through sanding, rubbing with steel wool, or washing with one of the commercial gloss removers. These treatments also remove dirt which tends to collect in such areas.

Manufacture

Several types of conventional paint manufacturing equipment are being used for the production of exterior acrylic emulsion paints, including high speed impeller type mills and high speed stone mills. The manufacturing procedure is relatively simple. It consists of first making a pigment dispersion in water. Part of the acrylic emulsion must often be added to furnish sufficient liquid to wet the pigment. The balance of the acrylic emulsion is then mixed into the pigment dispersion, and the paint is tinted. The pH is then adjusted with ammonium hydroxide and the paint packaged.

Formulation Variables

A great many different types of formulations have been proposed for acrylic emulsion paints for wood surfaces. The seven-year exposure test program of Rohm & Haas, however, has defined rather clearly the formulation limits which give best durability characteristics with acrylic emulsion paints.

Paints with pigment volume concentrations in the range of 30% to 35% give better results than paints formulated at 40% to 50% pigment volume content. It is important to maintain high solids content in the coatings, approximately 55% minimum, to obtain films with adequate thickness.

The ratio of non-chalking to chalking type titanium dioxide is a factor which is subject to considerable choice by the manufacturer.

(*Turn to page 137*)

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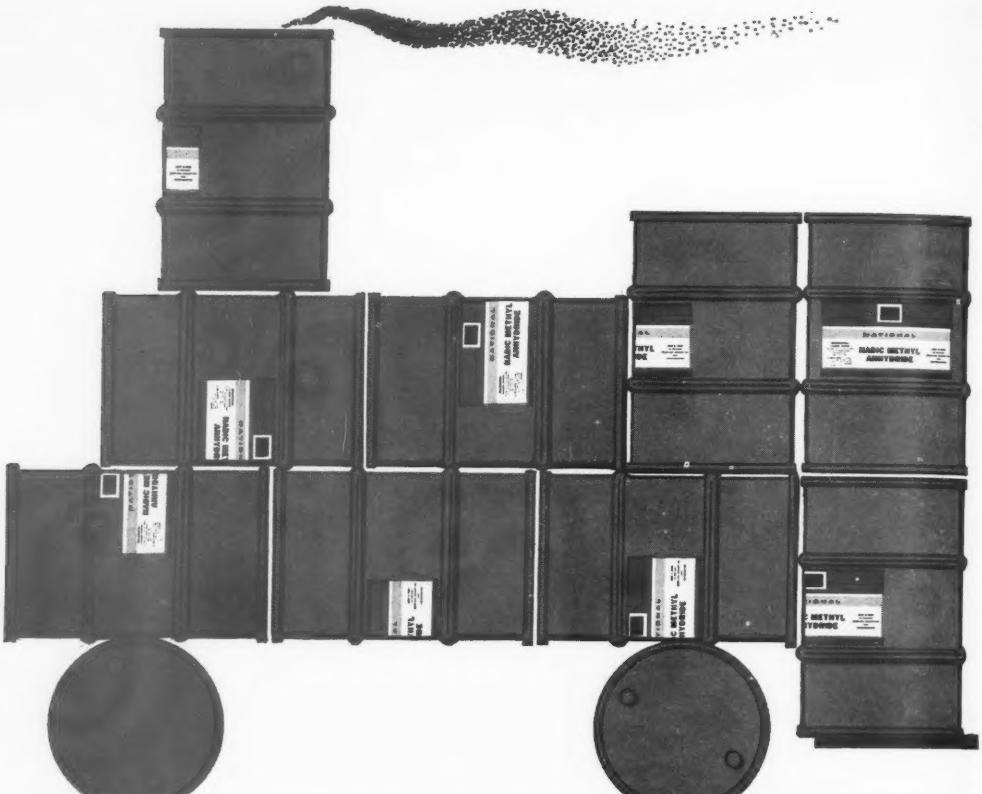

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Acrylic emulsion system demonstrates good adhesion and weatherability on exterior wood surface in various geographic areas.

ALL-LATEX-PRIMER-TOPCOAT SYSTEM

By
Robert Lalk*

AN acrylic-type latex (Dow Latex 2647) was designed by The Dow Chemical Company specifically for use in exterior wood paints. This latex, when properly formulated into paint systems, offers manufacturers and paint consumers:

a latex paint system which performs better than conventional oil and alkyd systems on various wood surfaces, metal trim and nails.

a latex paint system with better application and clean-up properties than conventional oil and alkyd systems.

a latex paint system which is simply formulated, which is produced on conventional paint manufacturing equipment, and which has excellent compatibility, shelf stability, and a competitive raw material cost.

a latex paint system for primer, topcoat, and repaint formulations.

a latex paint system which possesses specific advantages over competitive commercial latex paint systems for exterior wood.

The properties and property advantages claimed above are established and confirmed by years of laboratory, test fence, and home exposures and evaluations. They were built into this latex because we recognized these attributes were necessary before any latex could be called to the paint manufacturer's attention.

Dow Latex 2647 systems can be formulated into latex paints for exterior wood which will thoroughly satisfy their users, which will encourage more painting and repainting, and which will, therefore, more effectively combat the use of non-paint surfaces.

Dow Latex 2647 and paints made with it are the subject of many pieces of Dow literature. In this short article, only a general review of paint properties and performance is possible. However, details and data on our various tests are available on request.

Adhesion

The latex in the exterior wood paint formulation affects the adhesion, protection, and weatherability of the paint. Of these properties, the most important is adhesion. If the paint doesn't stay on the surface, it's useless.

The simplest adhesion demand made of latex paints is where it must adhere, as a topcoat only, over an oil-type primer or undercoater. There are differences in the commercial latexes being offered even on this basic and simple adhesion requirement. An exposure program must be conducted under varying application and environmental conditions to compare or to contrast this intercoat adhesion of different latex systems.

In our exposures, Dow Latex 2647-containing paints show excellent adhesion to a wide range of oil and alkyd primers and topcoats in both new and repaint work.

Another measure of adhesion is in the ability of a paint to adhere to the many types of wood used for exterior home and building surfaces in various geographic areas. We have exposed paints formulated with this latex on cedar shakes, edge and flat grain red cedar, redwood, white and yellow pine panels in Midland, Michigan, the Texas Gulf coast, California and Florida. They have also been carried into home and building tests on all of these types of wood plus fir plywood soffits and panels and Philippine mahogany siding. Adhesion retention is very good in all instances.

The excellent adhesion characteristic of this particular latex emulsion, combined with its protection properties, has permitted the formulation of primers which

*Section Head of the Testing Section, Coatings Technical Service, The Dow Chemical Co., Midland, Mich.

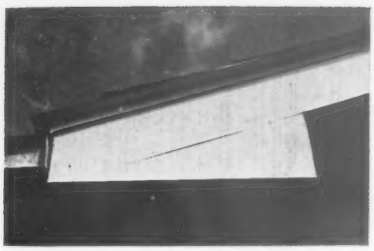


Figure 1

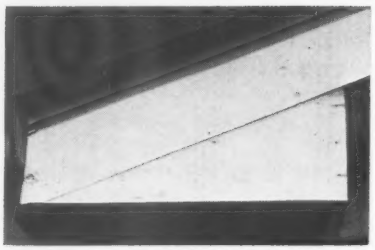


Figure 2

Figure 1 and figure 2 show south-facing cornices on the same house. Figure 1, where a Dow Latex 2647 topcoat has been applied over a latex primer, shows much better protection than the latex topcoat over an oil primer exhibited in figure 2.

make possible durable, all-latex paint systems over new wood. Adhesion retention of a latex system is affected by such factors as weatherability, moisture effects, and ability to bond to a weathered surface.

Weatherability

Dow Latex 2647-containing paint films resist the effects of weathering over the extremes of climatological conditions. They remain essentially flexible, despite wind, temperature, moisture, and UV exposure, and thereby prevent the buildup of stresses which can cause checking, cracking, and flaking types of failure in other paint systems.

Moisture Resistance

Paint films with Dow Latex 2647 are much more resistant to the effect of moisture on adhesion than are oil or alkyd paint system films. Blister box tests show a much slower buildup of moisture behind such paint films. In cases where conditions will produce complete saturation behind an oil primer topcoat system in three days or less, panels with the Dow Latex 2647 latex system are not saturated. Further, this latex system maintains much better adhesion than do oil systems when panels are deliberately saturated.

Paints made with this latex emulsion have been applied over a number of homes which have had persistent oil paint peeling problems because of moisture attack. The latex system is showing good retention of adhesion to the wood for periods of time now twice as long as it took for the previous oil systems to fail. Where failure was caused by internal moisture conditions, there generally is a continuation of the problem in the areas where the oil paint film remains. Where failure has been caused by external weather conditions, these paints have stopped the flaking loss of adhesion of the previous oil and alkyd paints.

Moisture resistance in its relation to adhesion also quite obviously affects protection properties and durability of the paint film. Dow Latex 2647 primers and topcoats have been designed to offer a precise balance of water vapor and liquid water permeability. In all instances, the basic properties of the latex film influence the effect moisture will have on the paint film and on the substrate.

Water vapor transmission data obtained from studies of continuous films show that vapor permeability is dependent primarily on the type of polymer. Our early work showed little correlation between moisture vapor permeability of films and the protection afforded wood by the paint system. However, correlation was established between liquid water permeability and increased protection of the wood substrate. An electrical conductivity test was devised during our polymer development work to accurately measure the degree of liquid water permeability of paint films made with various polymers.

Primer Work

The test was not only useful in designing Dow Latex 2647 to give excellent protection against water permeation, but also has been very useful in our formulating work with latex primers. This latex emulsion shows a very low permeability or rate of absorption of liquid water through its film, and it allows the formulation of 10 to 15 PVC primers which retain similarly low permeability properties.

Primer films made with Dow Latex 2647 have been applied over flat grain red cedar panels and in a number of home applications over a wide range of wood types, and have been exposed for up to three years, and show excellent protection of the several substrates. To evaluate differences in protection given by various latexes in our panel tests and to provide full information on their performance, we found it necessary to use the flat

Figure 3

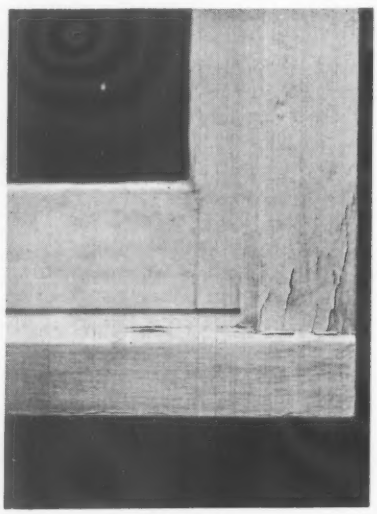


Figure 4

Both of these south-facing windows experienced a persistent peeling problem of earlier oil paint systems. The oil paint was scraped off to the bare wood substrate. In figure 3 the Dow Latex 2647 topcoat over latex primer shows no peeling after three years. In figure 4 and oil topcoat and primer system shows failure in less than two years.

grain types of wood siding which are being widely used for exterior siding, as well as good edge grain siding.

Resistance to water permeability is also important in giving protection against rust staining from nails and in the sealing off of water soluble materials present in red cedar and redwood. A primer film which allows migration of these water solubles will permit staining of topcoats applied over it. The low liquid permeability of Dow Latex 2647 films is a distinct asset in combatting these problems, although film thickness is also important.

The latex systems, because of their easy application and good flowout, may have more of a problem in gaining adequate film thickness in a primer than do oil or alkyd systems. Our liquid permeability testing has shown that primer film thickness of at least 1 mil or more is necessary to give the protection required.

A marked increase in the rate of permeation of primers occurs between 15 and 20 PVC. Pigmentations should include TiO_2 to provide hiding and opacity, and should contain a lead pigment to insolubilize water soluble materials picked up during application of the primer, thus preventing staining. Most of our work has been with the basic silicate lead because of its lower specific gravity and low toxicity, although other lead pigments appear to be as effective in comparison tests.

A good dispersion of the pigments is needed to achieve maximum protection in this low PVC range. Improvements in film build and application properties have been obtained in the Dow Latex 2647 primer by dissolving Methocel thickeners into the pigment grind to give a higher solids paint formulation. The Methocel is wet out with ethylene glycol to prevent balling up and to increase the speed of solution. The HG type is more soluble at the temperatures developed in paint production and is the preferred material to use. It is most easily incorporated on high speed, high shear equipment such as the Kady Mill, Cowles dissolver, or Hockemeyer, but can be readily adapted to other paint production equipment.

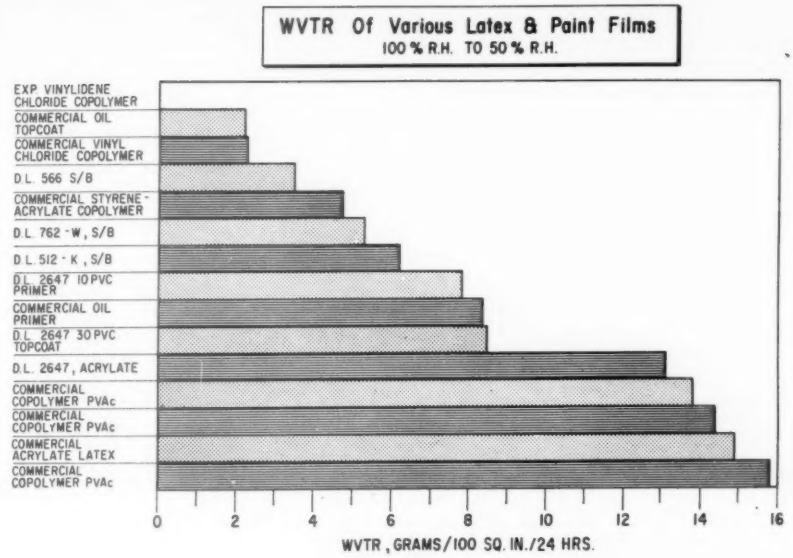


Figure 5

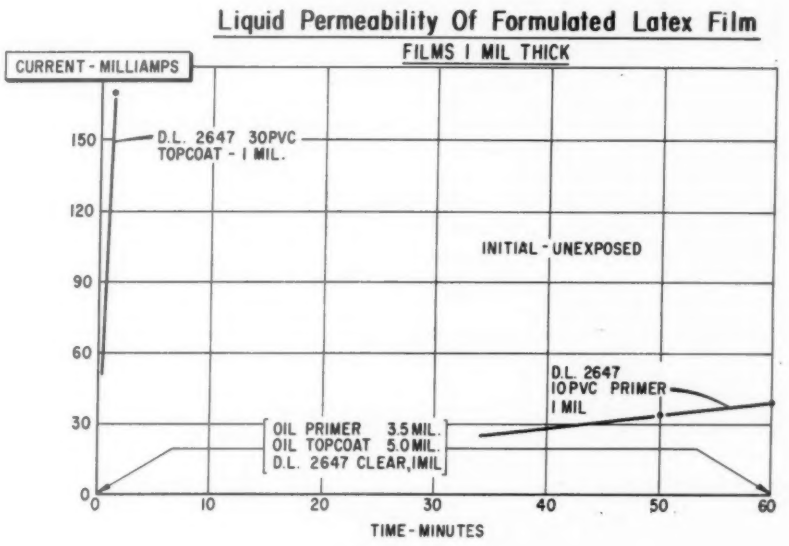


Figure 6

FORMULATION P-688-42-2
HIGH SOLIDS, HIGH BUILD
EXTERIOR WOOD PRIMER
(Experimental)

Ingredients	Pounds/100 Gallons
Water	75.0
Dispersant (25%)	2.3
Basic Silicate of Lead	95.0
Titanium Dioxide, Rutile	70.0
Polyglycol P-1200	2.0
*(Ethylene Glycol	14.0
(Methocel 4000 cps, 65 HG	2.3
Grind Through Morehouse or Similar Mill	
Dow Latex 2647 (47%)	727.0
*(Preservative	6.0
(Defoamer/Water (1/1)	10.0
Pigment Volume Concentration	10%
Solids	52%
Viscosity	75KU
pH	8.3-8.5

*Preblend, then add slowly with agitation.

Stir-in-Oil Technique

Weathered, chalking, oil and alkyd paint surfaces present a two-stage problem in repainting with latex systems. Water-thinned latex paints have difficulty in wetting out and absorbing the layer of loose chalk during application; the latex systems consequently have difficulty in getting good bond or adhesion to the firm under-chalk surface.

The need for a simple, easy-to-use all-latex system for repainting over aged, chalking oil systems resulted in development of the technique whereby 10 to 20% of a drying oil is stirred into the latex top-coat system. The success of this technique is dependent on the ease of emulsification of the modifier, the stability of the system, the extent of migration of the modifier into the weathered surface, and the type of bond developed between the modifier and the weathered surface and the modifier and the latex paint film. The common drying oils and alkyds are compatible with but not soluble in the Dow Latex 2647 polymer.

Adhesion and bond of the modified topcoat to the firm under-substrate (by the oil striking through the old oil chalk) is effected without sacrifice of latex application and clean-up properties or long term durability. This has been proved on a large number of home exposures over a wide range of differing weathered surfaces and weathering conditions.

The stir-in addition of oil to a Dow Latex 2647 paint results in durable two-coat latex refinish systems with good bond to weathered paint surfaces. In some colors, one coat of modified topcoat has been sufficient for coverage, but a second coat of straight unmodified latex topcoat is recommended for best appearance and durability.

Stir-in addition of oil to the latex primer also gives improved binding to weathered surfaces and the technique is being further studied and evaluated in the development of a universal latex undercoater-primer. Long term exposure of a 10 PVC mica, clear film series shows slight advantage on new wood from the penetration of the oil into the surface of the wood. This oil modification in the 10 to 20% range does not affect the permeability, flexibility, or other desirable properties of the essentially all-latex system. .

FORMULATION P-688-49-2
HIGH SOLIDS, HIGH BUILD
EXTERIOR WOOD TOPCOAT
(Experimental)

Ingredients	Pounds/100 Gallons
One Pass Through Morehouse Mill*	
Water	226.0
Dispersant	1.5
Preservative	6.0
Titanium Dioxide, Rutile	200.0
Titanium Dioxide, Anatase	20.0
Mica, 325 Mesh, Waterground	50.0
Calcium Carbonate	70.0
Clay	30.0
Ethylene Glycol) Premix and	15.0
Methocel, 4000 cps, 65 HG) add slowly	3.8
Polyglycol P-1200	4.0
Let Down	
Dow Latex 2647 (47%)	500.0
Defoamer/Water (1/1)	10.0
Pigment Volume Concentration	35%
Viscosity	88KU
pH	9.2
Non-Volatile	54.8%

*Kady Mill may also be used.

FORMULATION P-670-19-1
WHITE TINT BASE
EXTERIOR WOOD PRIMER
(Experimental)

Pigment Grind—One Pass Morehouse Mll	Tint Base Lbs./100 Gallons
Water	145.0
Potassium Tripolyphosphate	2.0
Preservative	5.0
Titanium Dioxide	180.0
Mica	50.0
Calcium Carbonate	40.0
Clay	40.0
Polyglycol P-1200	4.0
Let Down	
Methocel, 65 HG, 4000 cps. (2.5%)	150.0
Dow Latex 2647 (47%)	516.0
Nonionic Wetting Agent	8.0
Water Defoamer (1/1)	10.0
Pigment Volume Concentration	30%
Solids	49%
Total Gallonage	107.7

Topcoat Formulation

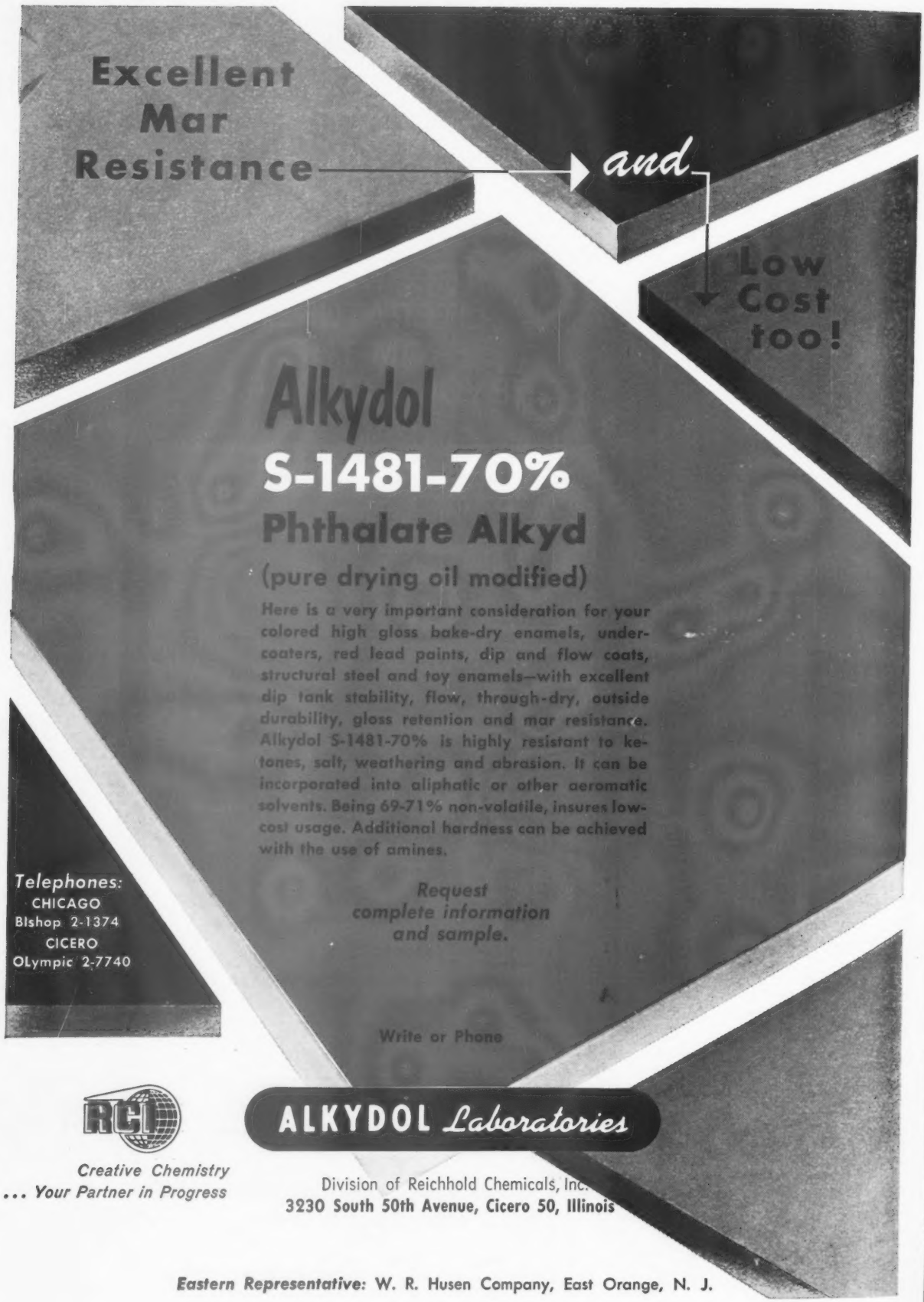
The formulation of exterior Dow Latex 2647 topcoat systems is conventional as are the manufacturing techniques. These are described in detail in our technical literature.

Inert pigments have a marked effect on the start of chalking and the appearance retention of these latex topcoat systems. The larger particle size clays and calcium carbonates provide better tint retention and allow formulating to higher PVC levels than do pigments such as mica and the talcs. Very coarse pigments such as diatomaceous silica exaggerate dirt collection. PVC levels in the range of 30 to 40 are satisfactory depending on the color and type of inert pigment. The use of some anatase TiO_2 is desirable to develop self-cleaning properties in the paint system. As mentioned under primers, the dissolving of Methocel directly into the paint formulation results in higher film build and can thus reduce the number of coats required.

Appearance and Color Retention

Properly formulated and ap-

(*Turn to page 139*)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Aromatic solvent modified polyvinyl acetate emulsion shows marked adhesion to chalky surfaces.

FINE PARTICLE SIZE EMULSION FOR EXTERIOR PAINT

By
Edward W. Melvin, Jr.*

INTRODUCED commercially only a little more than a decade ago, latex paints have caused a revolution in the paint industry. Latex paints have accented the do-it-yourself paint market. In the last five years the production of latex paints has almost doubled. It is estimated that total latex paint in 1959 approached 70,000,000 gallons.

Industry census figures indicate the exterior market for latex paints accounted for about 15% of the total. It is generally agreed that exterior latex paints are merely at the threshold of this tremendous market estimated at a total of 125,000,000 gallons. The result has been extensive research and development toward exterior applications. It is anticipated that exterior latex paints will approach the acceptance of interior latex paints. There is no doubt that latex paints are firmly established for interior coatings. With the wider consumer acceptance for interior latex paints, greater emphasis has been placed on marketing exterior emulsion paints.

Considerable exposure history and information has been developed in the past five years for exterior polyvinyl acetate and acrylic emulsion paints. Over the years, oil based paints achieved such properties as high hiding one coat application, improved self-cleaning and longer durability. Emulsion coatings can easily match these properties and offer additional advantages. These advantages are non-yellowing whites, remarkable tint retention, breathing films, ease of application and ease of clean-up. Therefore, formulations for exterior paints require careful compounding to obtain the maximum quality and performance of each ingredient.

It has been said by individuals in the paint industry that a company's reputation is established by the quality of its house paint. If that be the case, all care should be taken to market an exterior emulsion paint of proven performance.

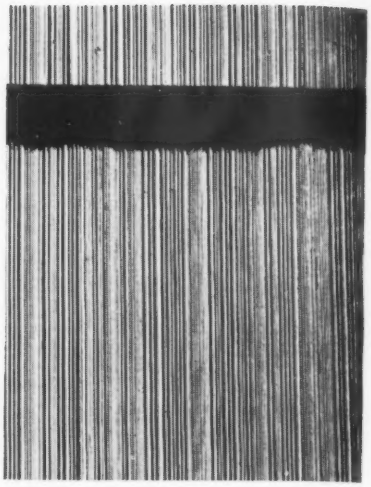
Formulation

Pigmentation of exterior formulations incorporate titanium dioxide to impart sufficient covering power for a high hiding one coat white. Lesser amounts are used naturally for tint base formulas. To achieve the desired rate of chalking for a self-cleaning paint, it is recommended that a ratio of 9:1 or 8:2 non-chalking to chalking pigment be used with a polyvinyl acetate system. Since acrylic paints usually exhibit a faster rate of chalking, it is suggested that the level of chalking pigment be kept to a minimum. In addition to the TiO_2, coarse particle size extender pigments such as clays, talcs and calcium carbonates are used to impart film durability, tent retention, pH control of the system and pigment packing. Also water ground mica is widely used for its film reinforcement effect. Tinting pigments for exterior formulations must have good stability to insure light fastness.

Exterior studies over wood indicate emulsion paints can be formulated to give good adhesion while maintaining sufficient flexibility and durability. Some high quality polyvinyl acetate copolymers provide outstanding tint retention and flexibility and adhesion. Over previously painted white pine, tests have shown excellent results for periods up to five years. These fine particle size copolymers pigmented in the 35-45 PVC range have shown excellent tint retention. Formulations based on a fine particle size polyvinyl acetate homopolymer required formulating at a lower PVC level to provide equal results.

Further development of new types of acrylic based polymers have also shown outstanding results. These fine particle size polymers have high pigment binding properties and hence can be formulated in the higher range for exterior application. These paints also show outstanding tint retention and durability in the 35-45% range. These polymers exhibit very good flexibility and adhesion over previously painted wood in good condition.

*Celanese Chemical Company, New York, N. Y.



The above house located in Chatham, N. J. was repainted in May 1956 with an exterior polyvinyl acetate paint based on CL-202. One coat white and gray was applied to the trim and siding respectively. The siding substrate was pre-dipped cedar shingles. Note the excellent condition of the paint film in the close-up (right) and the lack of staining. These photographs were taken in August 1960.

Figure 1. demonstrates these tint retention properties.

These polyvinyl acetate and acrylic paints have provided, in addition to excellent tint retention, paint films which "breathe" and permit the passage of moisture. This characteristic minimizes the problem of blistering. Also these films are resistant to yellowing for brightness of tints and whiteness of whites, are easy to apply and dry within 30 minutes under normal conditions. Improvements have also been made in low temperature application. By proper choice of solvents, laboratory tests indicate good film coalescence at temperatures as low as 35°F along with excellent freeze-thaw stability.

Production

Production of latex paints, particularly exterior formulations, is relatively simple. Uniformly controlled particle size ranges of prime and extender pigments are available to the industry. These pigments do not require additional grinding and therefore permit the use of simple types of dispersion equipment to provide a uniform paste. Modern high speed dispersers are available to do this job. The paste is then let down with thickener and emulsion to produce the paint. The batch is finished off for final tinting and viscosity adjustment as required. Often the complete cycle of these steps is accomplished in a single mixing tank before filling.

Improving Adhesion

Several approaches have been suggested for latex primers over chalky surfaces using dehydrated castor oil and tung oil modifications. The Celanese laboratory has reported an improved solvated emulsion primer for these types of surfaces. Initial results indicated the use of aromatic solvent in a PVAc emulsion primer formulation materially increased adhesion to chalky surfaces. Further work has improved the stability of this emulsion-solvent system to produce a commercially acceptable product. This improved primer under laboratory tests has passed five freeze-thaw cycles and one week accelerated aging at 130°F. This primer is applied like a conventional latex paint and retains all the desirable properties of a water based system. Equipment may be cleaned with soap and water. Results to date on exterior exposures of this primer over actual chalking surfaces are not showing any adhesion failure.

Although current thinking is inclined toward recommending an oil or alkyd resin base primer for new wood, research is continuing to explore the possibility of an aqueous based primer for this application. The solvent modified latex system mentioned above is currently being evaluated as a primer for new wood. Results thus far indicate that this primer compares favorably with an oil base system with respect to adhesion and durability.

In analyzing the latex versus the oil base primer over new wood, a major question arises. Is the durability of the primer directly related to the nature of the system or is it related to the film thickness applied to the substrate? For example, any oil base primer may contain as much as 75% solids, whereas the solids of a latex primer may be about 50%. Theoretically, therefore, an oil base primer should deposit a film approximately fifty percent thicker than a comparable latex primer film. Is this difference in film thickness providing increased protection? A study of film thickness of oil and latex paints versus durability is in progress. Preliminary data indicates that the durability of the film may well be dependent on film thickness.

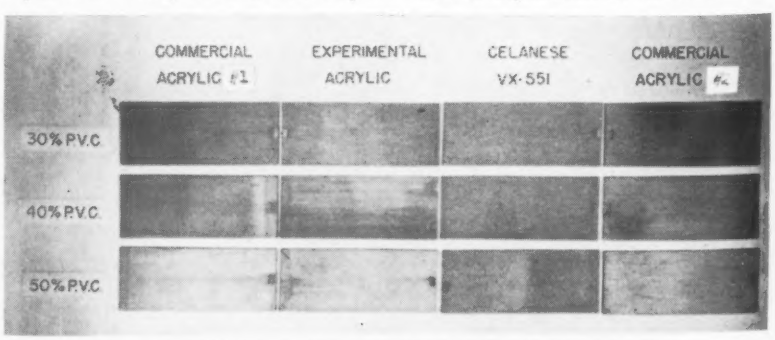


Figure 1. 900 Hour Weatherometer Study of Latex Vehicles
Two Coats Test Paint Over Primed White Pine
Comparative weatherometer study of acrylic paints showing outstanding tint retention of Celanese VX-551, a new acrylic based tripolymer.

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Moisture vapor transmission test data found invaluable in predicting performance of latex paints on outdoor surfaces.

DURABILITY OF EXTERIOR LATICES

By
John A. Gordon, Jr.*

With the introduction of latex paints, formulators have had to develop new techniques for the laboratory evaluation of materials and products and it has been necessary to give new interpretations to test data in order to predict durability limits and failure patterns as accurately as possible.

Mr. Gordon discusses laboratory data for moisture vapor transmission for several exterior type latices and correlates the data with panel tests, panel exposures and actual full scale practical controlled exposures which have been underway for several years by Monsanto in developing new and better coatings.

NO single laboratory test can fully predict durability limits or failure patterns for coatings formulas. However, it has been noted that Moisture Vapor Transmission data can help greatly in predicting the resistance of latex paint systems to chemical fumes, staining over wood, development of efflorescence on masonry, adhesion on non-porous surfaces, and blistering over primed and unprimed wood. Latex paints with low moisture vapor transmission rates are superior to those having high transmission rates in adhesion, resistance to stain development, freedom from efflorescence, resistance to discoloration by chemical fumes, and durability. They show similar blister resistance as good quality oil paints and are free from blistering when applied over the same type primers as those generally used for oil paint systems. Latex paints having low MVT do not blister over cement surfaces and they do not blister or lose adhesion over hard non-porous or properly primed surfaces under conditions of high humidity and heavy rainfall.

Properties Depend on Polymer

With synthetic polymer latices the initial film properties depend on the nature of the polymer which forms the solid portion of the latex. Polymer types must be chosen to be soft enough to form good flexible adherent films on many surfaces under a wide variety of climatic conditions. This should be done by a careful choice of monomers for the polymer. It is true that some latices are modified by the addition of solvents or plasticizers when the physical nature and chemical composition is such that this is necessary for adequate performance with regard to flexibility, adhesion, low temperature coalescence or pigment binding capacity. This technique, however, is an attempt to modify an existing polymer to overcome certain property deficiencies and the results are seldom as desirable as they would be if the polymer had the necessary characteristics built in through its monomeric constitution.

Moisture Vapor Permeability

One measure of the completeness of film formation is moisture vapor permeability of films made from various latices. Some data regarding moisture vapor transmission of films of various latices will be found in Table I.

An inspection of the data in Table I, will help to explain some phenomena which have been observed on panels and in full scale exposures of various latex paint systems for the last seven years.

Resistance to the development of efflorescence over masonry surfaces seems to be related to low MVT with pigmented films. It has been observed that at given practical pigment volume concentrations paints made from the styrene acrylic interpolymer latices show very little, if any, efflorescence in a wide variety of climatic areas over many different types of mas-

*Technical Service Representative—Surface Coatings, Plastics Div., Monsanto Chemical Co.

Table I

Latex	Specific MVT*	
	Clear Film	40% Pigment Volume Conc. Paint Film
A — Styrene Acrylic Inter.	6.1	6.2
B — Acrylic Latex A	46.0	32.5
C — Acrylic Latex B	31.8	18.7
D — PVAc Copolymer A	43.0	75.0

*Specific MVT — Grams of water vapor passing through 100 square inches of film, 0.004 inches thick, per 24 hours. These data were obtained following the procedures of ASTM E-96-53T = Procedure E.

Table III. Fume & Blister Resistance[1]

Paint	Self Primed	Primer No. 2	Primer No. 6
30% P.V. Mod. Acrylic (A)	No stain No blister	No stain No blister	Mod. stain No blister
30% P.V. Acrylic (B)	No stain No blister	Mod. Stain Blistered	Severe stain — blistered
40% P.V. Mod. Acrylic (A)	No Stain No blister	V. Sl. Stain No blister	Mod. stain No blister
40% P.V. Acrylic (B)	Slight stain No blister	Mod. stain Blistered	Severe stain — blistered
50% P.V. Mod. Acrylic (A)	No stain No blister	No stain No blister	V. Sl. Stain No blister
50% P.V. Acrylic (B)	No blister V. Sl. Stain	V. Sl. Stain blistered	Severe stain — blistered

1 Panels prepared the same as for wet scrub test.
Exposure was 16 hours at 70°C., 100% relative humidity, and 250 ppm. Hydrogen Sulfide.

A. Conclusions from tests outlined in Table No. III.
1. On unprimed panels low MVT latex paints showed no stains whereas higher MVT latex paints exhibit sl. cedar stains.
2. Oven primer low MVT latex paints were virtually free from fume staining whereas higher MVT latex paints show a considerable amount of fume induced stains.
3. Low MVT latex paints were blister free when self primed or applied over primers.
4. Higher MVT latex paints exhibited blistering over primed surfaces.

Table II — Wet Adhesion*

Paint	Primer	Results
30% P.V. Mod. Acrylic (A)	None	1500 cycles very slight end peeling
30% P.V. Acrylic (B)	None	1500 cycles very slight end peeling
40% P.V. Mod. Acrylic (A)	None	1500 cycles very slight end peeling
40% P.V. Acrylic (B)	None	1500 cycles 4 - 6 inches end peeling
50% P.V. Mod. Acrylic (A)	None	1500 cycles very, very slight end peeling
50% P.V. Acrylic (B)	None	1500 cycles very, very slight end peeling
30% P.V. Mod. Acrylic (A)	Commercial	337 cycles completely peeled
30% P.V. Acrylic (B)	Primer	181 cycles completely peeled
40% P.V. Mod. Acrylic (A)	No. 2**	400 cycles completely peeled
40% P.V. Acrylic (B)		188 cycles completely peeled
50% P.V. Mod. Acrylic (A)		1500 cycles very slight end peeling
50% P.V. Acrylic (B)		442 cycles completely peeled
30% P.V. Mod. Acrylic (A)	Commercial	1000 cycles 2 inch peel
30% P.V. Acrylic (B)	Primer	242 cycles completely peeled
40% P.V. Mod. Acrylic (A)	No. 6***	1000 cycles ½ to 1 inch peel
40% P.V. Acrylic (B)		256 cycles completely peeled
50% P.V. Mod. Acrylic (A)		1500 cycles 3 inch peel
50% P.V. Acrylic (B)		231 cycles completely peeled

* Panels were prepared by priming select ¾ x 12 x 1½ inch cedar panels with the indicated primer which was allowed to dry 120 days at room temperature. The primed and unprimed panels were given two coats of the indicated latex paint with 24 hours between coats and 7 days dry for the system before testing. Testing was done in the Gardner straight line scrubbing machine using a bristle brush and distilled water. For this test the indicated comparison paints were put on the same panel so paints of the same pigment volume had exactly the same substrate. Backs, sides, and ends of the panels were coated with paraffine wax from toluol solution to prevent the pick-up of water during the test.

** (Primers No. 2 and No. 6 were commercially available, national manufactured, blister

*** (resistant house paint primers purchased for this test.

Conclusion from data outlined in Table No. II

Low MVT latex paint shows

1. Better adhesion over unprimed wood.
2. " " " primed wood.
3. All latex paints tested show better wet adhesion over unprimed wood.
4. Adhesion over the two primers tested indicate the importance of proper primer selection for latex paints.

Table IV. Blister Resistance*
14 Days Exposure

Paint	Panel	Results
40% P.V. Mod. Acrylic (A) 40% P.V. Acrylic (B)	Cedar Panels Primed With Commercial Primer No. 2	No Change No Change
40% P.V. Mod. Acrylic (A) 40% P.V. Acrylic (B)	Johns-Manville ⅛ in. Flexboard 4 x 12 in. 2 coats — No primer	No Change Very slight Blistering

* Test run on a stainless steel water bath filled to a constant level with distilled water kept at 80° ± 1°C. Panels were placed on the bath with their painted sides up and the open area of the bath not covered by panels was covered by glass strips. Latex paints were applied by brush to select cedar panels 4 x 12 x ½ inches primed with commercial primer and allowed to dry 120 days. Two coats were applied with 24 hours between coats and 7 days dry was given the finished system before testing. Both coats of paint were applied to the ends and sides but no coating was applied to the backs of the panels. Flexboard panels were coated on the smooth side.

Conclusions from tests outlined in Table No. IV.

1. No blistering with either latex paint tested over primed wood.
2. Slight blistering observed on flexboard self primed with higher MVT latex paint.

onry surfaces. On the other hand, paints of the same pigment volume concentration made from either acrylic or polyvinyl acetate copolymer latices show efflorescence in about the order of specific MVT data as displayed in Table I.

In these cases efflorescence has been noted as a deposit of crystals generally with some color change, either on most of the exposed surface, in the case of very rough or highly alkaline masonry, or along cracks and over mortar joints in the case of smooth or masonry construction. On panels the efflorescence usually produces uneven color or blotchy surfaces but on buildings it tends to follow cracks or breaks in the surface and, in areas of high humidity where con-

(*Turn to page 141*)

Figure 1. Wet Scrub Test

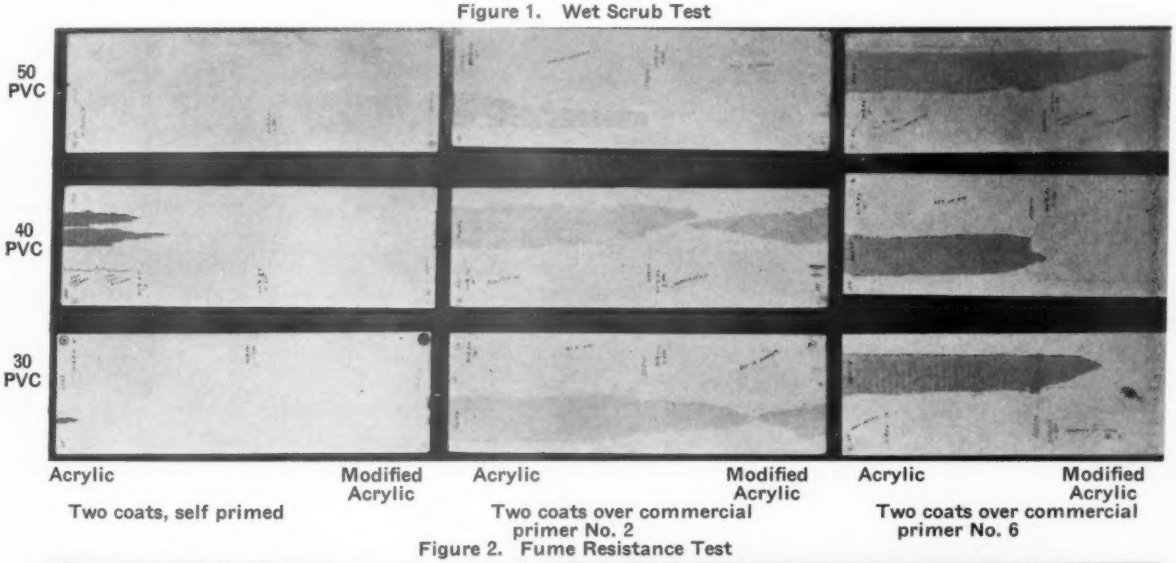
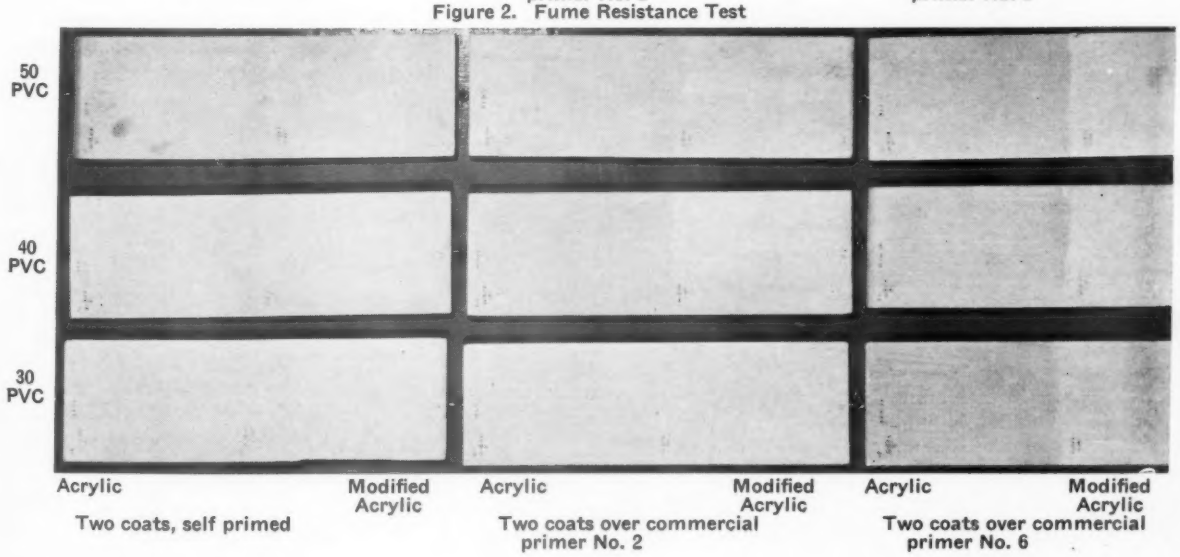


Figure 2. Fume Resistance Test



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A rundown of important factors to be considered for obtaining best results of emulsion on exterior wood.

EXTERIOR EMULSION PAINTS FOR WOOD

By
Israel Feld*

FOR more than ten years, exterior emulsion paints have given excellent performance on a wide variety of masonry and cementatious substrates. Emulsion paints gained their initial impetus in sales on these surfaces because of their excellent alkali resistance. However, as more exterior emulsion paints were used and the paint consumer became more familiar with them, other striking advantages were found with this coating system which further enhanced their popularity.

Advantages

Tint Retention and Durability

Exterior emulsion paints have repeatedly shown excellent tint retention and durability even after four to five years exposure on houses. Emulsion polymers are saturated and do not contain bonds which absorb strongly in the ultraviolet light region; therefore, these polymers are much more resistant to vehicle destruction through ultraviolet light attack than unsaturated organic polymers such as oils and alkyds. This is borne out in paints based on emulsion vehicles which show much better tint retention and much less chalking than conventional oil paints. In addition, exterior emulsion paints have shown very good adhesion, integrity of film and blister resistance.

Ease of Application

Exterior emulsion paints have been easily applied for years with brush, roller and spray equipment. An outstanding feature of emulsion paints is the ease with which they are brushed—and most exterior coatings are applied by brush.

Rapid Dry of Emulsion Paints

Exterior emulsion paints normally require less than two hours drying time and in many cases will dry in thirty minutes. The rapid dry of emulsion paints allows two coats of paint to be applied in the same day. Painting contractors

FIGURE 1

Exposed: April, 1957
Surface: Cedar Shakes, Masonry foundation, plywood panel garage door, gutters, downspouts; painted with linseed oil house paint two years previously.
Location: Rahway, New Jersey
Color: Sandalwood
Date of Photograph: September, 1959
Age of Exposure: 2 years 6 months
Condition: Surface condition of house is good. Very slight chalking on South and East exposure. No primer used.

*Manager of Technical Service, Surface Coating Emulsions, Reichhold Chemicals, Inc., Elizabeth, N. J.

FIGURES 2 and 3

Exposed: July, 1957
Surface: Previously oil-painted wood siding; slightly chalked
Location: Southern California
Color: White
Date of Photograph: October, 1959
Age of Exposure: 2 years 3 months
Condition: Surface condition of house is good. The door and door frame was painted with a "non-yellowing" long oil alkyd semi-gloss paint. The difference in non-yellowing properties between the emulsion and alkyd paints is apparent.

report that, many times, two coats of emulsion paint can be applied to the same area without moving the scaffold. The rapid dry of emulsion paints also reduces the possibility of damage to paint jobs which may be caused by a sudden rain several hours after paint application.

Easy Clean Up of Emulsion Paints

Brushes, rollers, spots and spills of emulsion paints may all be easily cleaned with warm soapy water. This ease of clean up has been an important factor in the very large increase in trade sales of emulsion products in recent years.

The excellent exterior performance of emulsion paints on masonry surfaces caused the major emulsion paint and vehicle manufacturers to investigate the use of emulsion paints on wood. For the past four and five years, extensive experimentation and exposure of exterior emulsion paints on wood have been conducted on test fences and test houses.

The results of this exposure program indicate that exterior emulsion house paints perform exceedingly well when they are applied properly to a firm substrate. Exterior emulsion paints on wood have shown better tint retention, chalk resistance and film durability than conventional oil paints in many of these test exposures.

However, present emulsion paints do not wet out chalk or exceptionally dirty surfaces as well as conventional exterior paints and precautions must be taken when using this type of paint to obtain maximum performance from the paint.

Formulating Exterior Emulsion Paints

Choice of Emulsion Vehicle

Since polyvinyl acetate and acrylic ester emulsions are presently recommended for exterior emulsion paints, one important question today is which emulsion vehicle should be used. Our tests indicate that both polyvinyl acetate copolymer and acrylic ester emulsions perform satisfactorily for durability on wood. We have found, however, that polyvinyl acetate copolymer emulsion paints, in general, are outstanding for tint retention and chalk resistance and superior to paints based on either straight acrylic or modified acrylic emulsions. In addition, polyvinyl acetate copolymer emulsion is also considerably lower in cost than acrylic emulsions.

Choice of Pigmentation

Previous studies on masonry substrates indicate that the optimum PVC range for maximum tint retention of polyvinyl acetate copolymer paints is approximately 32-40% PVC, depending on molecular weight, particle size and water absorption properties of the emulsion. The coefficient of expansion for wood is much greater than for masonry substrates and more distensible paint films are necessary for wood substrates. Exterior emulsion paints, formulated at approximately 30% PVC, have been found to be satisfactory for flexibility and distensibility on wood substrates after more than three years exposure.

Rutile titanium dioxide is recommended for tinted exterior emulsion house paints. However, for white paints, a portion of the rutile titanium dioxide should be replaced with anatase pigment to provide some chalking and self-cleaning properties of these low PVC exterior paints.

Calcium carbonate and talc extender pigments have given somewhat superior performance to other commonly used extenders in exterior exposure studies of emulsion paints. These test also indicate that superior tint retention is obtained with medium-coarse particle extender than with fine particle extender with the same type of pigment at the same nominal PVC. We postulate that the medium-coarse particle extender pigment has a smaller pigment surface area than the fine particle pigment and therefore requires less vehicle to coat the surface. Although the paint with the medium-coarse particle extender is at the same nominal PVC as the fine particle extender, it behaves as a lower PVC paint.

Typical examples of exterior emulsion house paints based on a fine particle polyvinyl acetate copolymer emulsion and an acrylic

ester emulsion are presented in Tables I and II.

Obtaining Maximum Service

Application on Unpainted Wood

Factory applied exterior emulsion paints have been used successfully on unpainted striated cedar shingles and shakes. These surfaces are relatively small compared to siding or clapboard and do not present a long continuous film to the weather. This reduces the severity of exposure and likelihood of film failure. Durability of emulsion coatings applied directly to shakes and shingles have proven to be satisfactory for more than three-four years. Cedar staining, however, is a problem and specific lots of cedar shingles do give trouble in this respect.

Exterior exposure tests on cedar and pine clapboard indicate that application of two coats of an exterior emulsion paint directly to these surfaces causes grain raising and early film cracking in addition to cedar or other wood staining. Concurrent tests using oil primers and an exterior emulsion top coat were in excellent condition after three years exposure. Based on these and other test, the application of exterior emulsion paint to unpainted wood surfaces is not recommended. It is suggested that a zinc-free, blister-resistant, oil primer similar to Federal Specification TT-P-25 or another proven oil or alkyd primer be used as a prime coat on unpainted wood surfaces which then can be topcoated with an exterior emulsion paint. Tests indicate that the combination of an oil-based primer and an exterior emulsion topcoat outperforms an all-oil system.

Application to Chalky Surfaces

Houses that need repainting today were probably finished with paints based on oils and alkyds which are susceptible to ultraviolet light degradation. The process degradation of surface binder by sunlight causes the formation of surface chalk which is the result of pigment remaining on the surface after the surface binder has been decomposed.

If a previously painted wood surface is in poor condition and contains a heavy layer of surface chalk, both oil-based paints and emulsion paints would probably fail due to poor adhesion. Oil-based paints, however, have shown much better adhesion on moderately chalked surfaces than emulsion paints because of superior wetting of the oil binder. Emulsion binders

(*Turn to page 142*)

Table I.

Exterior House Paint Based on 9120 Wallpol Copolymer

Ingredient	Pounds	Gallons
Water	100.0	12.0
Potassium Tripolyphosphate	1.25	0.1
Non-ionic Wetting Agent*	2.0	0.25
Water Dispersible Lecithin	3.0	0.35
Butyl Cellosolve Acetate	8.0	1.0
Ethylene Glycol	25.0	2.7
Titanox RA-50 or equivalent (1)	200.0	5.7
Medium-Coarse Particle Calcium Carbonate	100.0	4.4
Disperse in Suitable Apparatus		
Defoamer	2.0	0.2
3% Sol'n Cellosize WP-4400 (2)	100.0	12.0
9120 Wallpol (3)	430.0	47.2
Water	125.0	15.0
Phenyl Mercuric Acetate Sol'n 18% Hg	5.0	0.5
	1101.25	101.4

*Makon 10, Igepal CO-630, Tergitol NPX, or equivalent.

For use as a nontinted white paint, the addition of 20 lbs. of anatese titanium dioxide (Titanox A-MO or equivalent) is recommended.

Non-Volatile	50%
pH	7.2
Viscosity	72 K.U.
Pigment Volume Concentration	30%
Weight Per Gallon	10.9 lbs.

(1) Titanium Pigments Company
(2) Union Carbide Chemicals Company
(3) Reichhold Chemicals, Inc.

Table II.

Exterior House Paint Based on 9401 Synthemul Acrylic Copolymer Emulsion

Ingredient	Pounds	Gallons
Water	100.0	12.0
Tamol 731—25% (1)	5.0	0.6
Water Despersible Lecithin	3.0	0.3
Non-ionic Wetting Agent*	2.0	0.25
Ammonium Hydroxide, 28%	1.0	0.1
Titanox RA-50 or equivalent (2)	200.0	5.7
Medium-Coarse Particle Calcium Carbonate	100.0	4.4
Defoamer	2.0	0.2
Disperse in Suitable Apparatus Adjust pH to 9.0 with Ammonium Hydroxide		
Defoamer	3.0	0.4
3% Sol'n Cellosize WP-4400 (3)	117.0	14.1
9401 Synthemul (4)	495.0	55.6
Ethylene Glycol	25.0	2.7
Phenyl Mercuric Acetate, 18% Hg	8.0	0.8
Water	25.0	3.0
	1086.0	100.15

*Makon 10, Igepal CO-630, Tergitol NPX, or equivalent.

For use as a non-tinted white paint, the addition of 20 lbs. of anatase titanium dioxide (Titanox A-Mo or equivalent) is recommended.

Non-Volatile	49.3%
pH	8.8
Viscosity	74 K.U.
Pigment Volume Concentration	30%
Weight Per Gallon	10.9 lbs.

(1) Rohm & Haas Company
(2) Titanium Pigments Corp.
(3) Union Carbide Chemicals Company
(4) Reichhold Chemicals, Inc.

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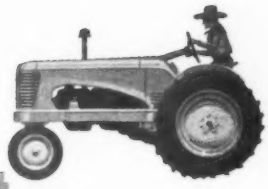
Also available in split cars

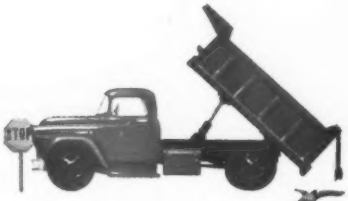
PHILLIPS PETROLEUM COMPANY
Special Products Division
Bartlesville, Okla. FEderal 6-6600

Now...with M50* Pigment...



You can have One-Coat Metal Protective Enamels better by far, than ever before!

Unique for resistance to rust creepage under the film



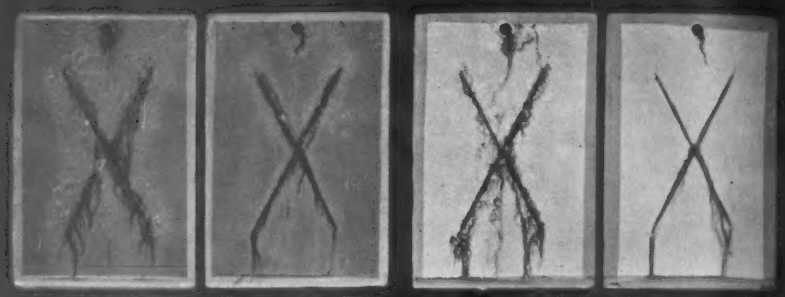
Superior for color range

Outstanding for weather resistance

See on the pages that follow dramatic laboratory photographs that show how much more you have in One-Coat Metal Protective Enamels made as they now can be made ... with *M50** basic lead silico chromate pigment.

*Registered trademark of **National Lead Company**

General Offices: 111 Broadway, New York 6, N.Y.



7528 7529 7518 7519

Test panels . . . after exposure

7528 7529 7518 7519

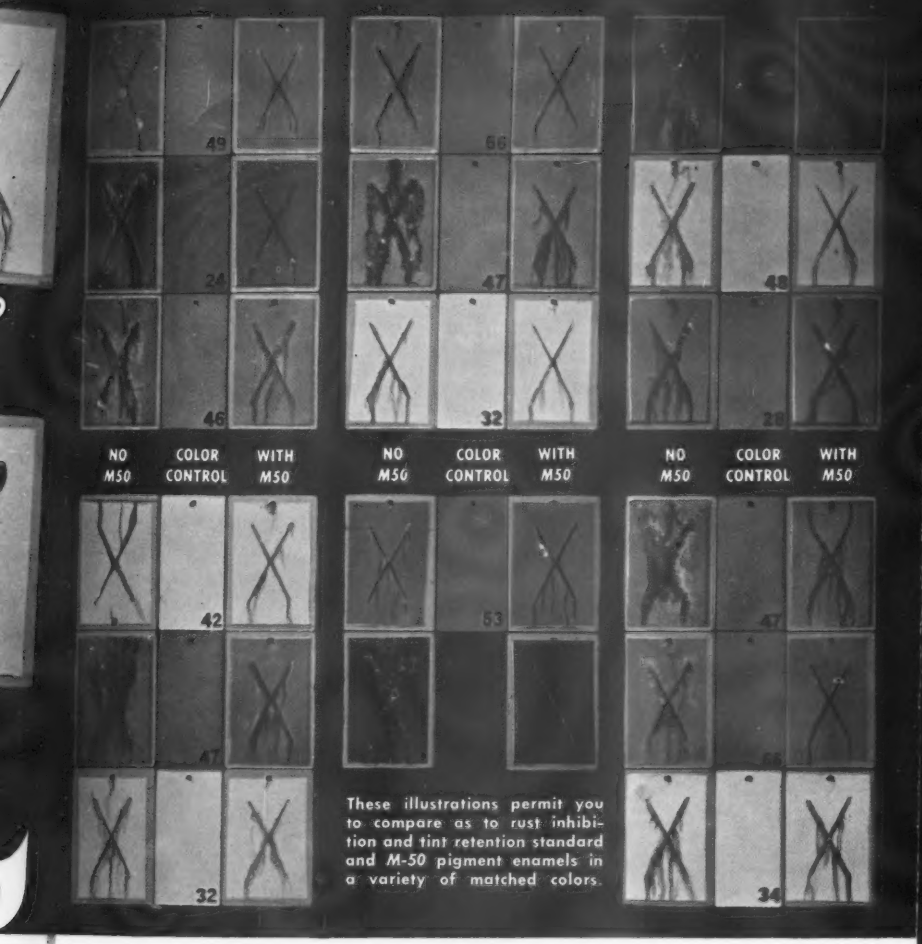
Duplicate test panels
. . . with loose paint removed

Salt fog test panels provide dramatic evidence!

Nothing compares with *M50* pigment . .

How tests were made — Test panels shown were scored and then exposed to 5% salt fog for 300 hours. Even-numbered panels were painted with standard industrial enamels. Odd-numbered panels were painted with color-matched, *M50*-pigment-fortified modifications made up with the same vehicles.

The four panels at the top permit you to compare appearance of the matched paints after exposure. The four panels at the bottom have loose paint removed so that you can compare the true extent of rust creepage under each paint film. Enamels were applied over clean, cold-rolled, auto body steel.



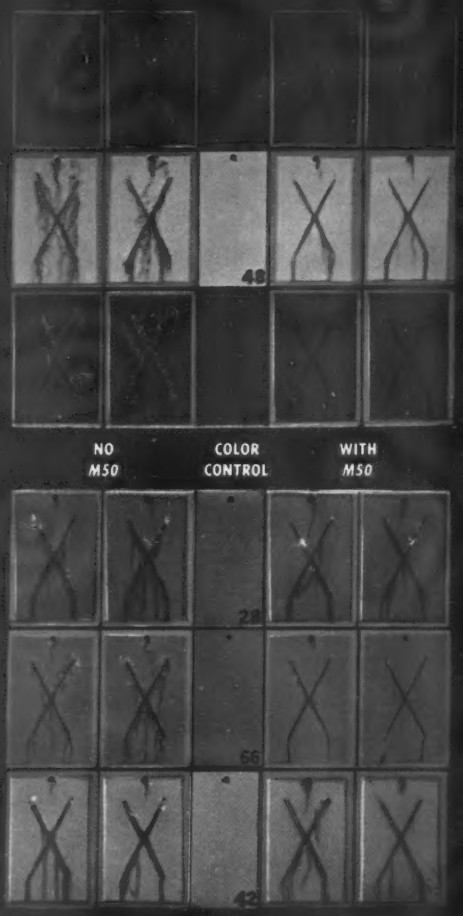
These illustrations permit you to compare as to rust inhibition and tint retention standard and *M-50* pigment enamels in a variety of matched colors.

nt . . . for making a matched-color, one-coat

At National Lead Laboratories, One-Coat Metal Protective Enamels that match many colors currently used in such paints have been given comparative salt fog box tests. Here, spread out for your inspection, are a few examples.

As you can see, in each case, *M50** basic lead silico chromate pigment greatly increases the resistance of the enamel to under-the-film rust creepage. However, it should be understood and remembered... ***the more M50 pigment, the better the protection.***

As you can also see, the benefits of this powerful rust inhibitor can be incorporated without lessening the formulator's ability to match a wide



Tests shown at left were made in duplicate. The test groups right allow you to compare duplicate pairs in six typical groups. Notice that results are consistent.

enamel fortified with rust inhibitor

range of popular colors.

See for yourself!

If you make Metal Protective paints of *any* kind—or if you want to learn more about them...you should see for yourself how these paints perform with and without *M50* pigment. You are invited to visit National Lead's Sayville, L. I. Test Station. Here you can see and make your own evaluation of new paints for dozens of uses. Gain new knowledge, too, about the causes of metal protective failures and how to overcome them.

*Registered trademark of **National Lead Company**

General Offices:
111 Broadway, New York 6, N. Y.

Formulae of YELLOW METAL PROTECTIVE PAINTS shown left

Pigment	STANDARD PAINT (T-7518) (POUNDS per 100 gals)	*M50* PAINT (T-7519) (POUNDS per 100 gals)
M50® (basic lead silico chromate pigment)	—	150.0
Chrome yellow medium*	300.0	150.0
TITANOX® RA-NC (titanium pigment)	10.0	10.0
BENTONE® 38 (gelling agent)	3.0	3.0
	313.0	313.0
Vehicle		
Alkyd resin soln.**	570.0	570.0
Mineral spirits	119.0	109.8
Lead naphthenate (24%)	3.6	3.6
Cobalt naphthenate (6%)	1.4	1.4
Manganese naphthenate (6%)	1.4	1.4
Anti-skinning agent	1.0	1.0
Methyl alcohol – water (95 – 5%)	0.9	0.9
	697.3	688.1
TOTALS	1010.3	1001.1

PVC: 7518, 17.55; 7519, 20.4 Weight per gal: 7518, 10.1; 7519, 10.0 *Imperial X1810 or equal
**Fed. Spec. TT-R-266, Type III Prewet BENTONE 38 with methyl alcohol – water

Formulae of ORANGE METAL PROTECTIVE PAINTS shown left

Pigment	STANDARD PAINT (T-7528) (POUNDS per 100 gals)	*M50* PAINT (T-7529) (POUNDS per 100 gals)
M50® (basic lead silico chromate pigment)	—	160.0
Molybdate orange*	120.0	80.0
Chrome yellow orange**	80.0	—
BENTONE® 38 (gelling agent)	3.0	3.0
	203.0	243.0
Vehicle		
Alkyd resin soln.***	570.0	570.0
Mineral spirits	134.7	118.8
Lead naphthenate (24%)	3.6	3.6
Cobalt naphthenate (6%)	1.4	1.4
Manganese naphthenate (6%)	1.4	1.4
Anti-skinning agent	1.0	1.0
Methyl alcohol – water (95 – 5%)	0.9	0.9
	713.0	697.1
TOTALS	916.0	940.1

PVC: 7528, 11.9; 7529, 17.6 Weight per gal: 7528, 9.16; 7529, 9.40 *Imperial X2552 or equal
**Imperial A4138 or equal ***Fed. Spec. TT-R-266, Type III
Prewet BENTONE 38 with methyl alcohol — water

. . for preventing rust creepage under One-Coat Metal Protective Enamels

These test panels show the amazing rust inhibition established by One-Coat Metal Protective Enamels made with *M50*® basic lead silico chromate pigment.

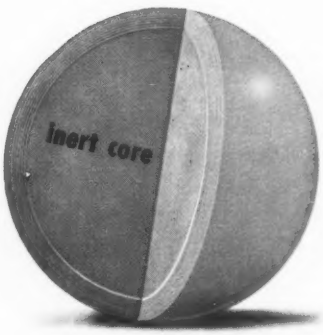
Notice that the use of *M50* pigment greatly retards both rust staining of paint surface (top test panels) and under-the-film rust creepage (bottom test panels). With *M50* pigment, damage to metal is restricted to immediate vicinity of break.

This same outstanding performance has been duplicated by *M50* Metal Protective Enamels in a wide range of other colors. For details lift flap.

Idealized conventional pigment particle

Solid

Idealized ***M50*** pigment particle



Coated

This diagram shows one reason why the *M50** particle is so efficient in the One-Coat Metal Protective Enamels described on preceding pages. As you can see, *all* the reactive content is surface-located . . . all available for the reactions which inhibit corrosion. None of the compound you want is buried *within* the particle where it would be useless. Another reason is that the reactive portion of the *M50* particle is a fused lead chromate. Fusion stabilizes the particle, and thus aids tint retention. The *M50* particle is also virtually insoluble in water.

It is these pigment properties that permit *M50* One-Coat Metal Protective Enamels and other *M50* Metal Protective Paints to be offered as superior-performance products.

* * *

The *M50* pigment particle has undergone more than twenty years of intensive pigment research including some eleven years of exposure testing and paint production.

The superior performance of these paints and variations of them is traceable to the use of *M50* pigment with its unique chemical compound and physical structure consisting of silico particles fusion-coated with active lead-chromium compound.

Other *M50* Metal Protective Paints

M50 pigment has become a standard rust inhibiting pigment widely used in a variety of anti-corrosion primers, intermediates and finishes for steel structures, in tank paints, and in many other metal protective applications. Typical formulations have been developed and tested for paints with a variety of uses. If you would like to know more about the use of *M50* in specific paints of this type, just let us know.

(MORE ABOUT *M50* ONE-COAT METAL PROTECTIVE ENAMELS ON PRECEDING PAGES)

*Registered trademark

M50 an oncor TRADEMARK *Pigment . . . A Development of*

National Lead Company

General Offices: 111 Broadway, New York 6, N.Y.

CONVENTION PROGRAMS

25th PAINT INDUSTRIES' SHOW

73rd CONVENTION—NATIONAL PAINT, VARNISH and LACQUER ASSOCIATION

Drake Hotel, Chicago, Ill., October 27-29, 1960

38th ANNUAL MEETING—FEDERATION OF SOCIETIES for PAINT TECHNOLOGY

Sherman Hotel, Chicago, Ill., October 30—November 2, 1960

EXHIBIT AREA MAP & DIRECTORY

JOSEPH F. BATTLEY
President

Officers National Paint, Varnish and Lacquer Association

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73rd ANNUAL MEETING

NATIONAL PAINT, VARNISH & LACQUER ASSN., INC.
73rd ANNUAL MEETING
THE ROAD TO PROSPERITY IS PAVED WITH COLOR

73rd CONVENTION—NATIONAL PAINT, VARNISH and LACQUER ASSOCIATION

Drake Hotel, Chicago, Ill., October 27-29, 1960

H. B. DAVIS
Vice President

EUGENE F. COX
Treasurer

J. V. THOMPSON
Chairman, Exec. Committee

Program of 73rd NPVLA Meeting

GENERAL SESSION
2:30 P.M. Thursday, October 27
GRAND BALLROOM—THE DRAKE HOTEL
Presiding: Joseph F. Battley, President

Convention Call to Order
Our National Anthem
Invocation
Introduction of Guests
Retail Paint and Wallpaper Distributors of America
Stephen L. Wolf, President
National Paint Salesmen's Association
B. N. Allnutt, President-Elect
Canadian Paint, Varnish & Lacquer Association
C. H. Neroutsos, President
Can Manufacturers Sesquicentennial Presentation
Roger F. Hepenstal, President Can Mfrs. Institute
Presiding.....H. Braith Davis, Vice President
In Memoriam.....J. E. Creager, Chairman
Report of Treasurer.....E. F. Cox
Preliminary Report of By-Laws Committee.....Foster Miles, Chairman
President's Address.....Joseph F. Battley
Preliminary Report of Nominating Committee.....David H. Moran, Chairman
Introduction of Guest Speaker.....Joseph F. Battley
"Moscow Report"
H. C. McClellan, President
Old Colony Paint & Chemical Company
Announcements

ADVERTISING AND SALES PROMOTION MANAGERS' FORUM
9:30 A.M. Thursday, October 27
GRAND BALLROOM—THE DRAKE HOTEL
Presiding: J. F. Parenteau, Chairman

NATIONAL WOOD PROMOTION PROGRAM—Bernard C. Hartung and Brewster Terry, National Lumber Manufacturers Association
EDUCATING THE SALESMAN—Dr. Samuel Caplan, Director of Distributive Education, Temple University, Philadelphia, Penna.
WHAT THE WOMAN BUYER THINKS—Miss Trudy Dye, Curtis Publishing Company
ADVERTISING THAT RINGS THE BELL, OR DOESN'T—L. E. Purvis, Vice President of Gallup and Robinson, Princeton, N. J.
MARKETING MYOPIA—Theodore Levitt, Lecturer, Harvard Graduate School of Business Administration

LEGISLATIVE FORUM
10:00 A.M. Thursday, October 27
PARLORS E, F & G—THE DRAKE HOTEL
Presiding: Bruce Homer
Chairman, Labeling Sub-Committee
Sherwin-Williams Co.

1. Effect of Federal Hazardous Substances Labeling Act on Uniform Labeling
2. Pressurized Containers—Labeling Problems
3. Format Revision for NPVLA's "Labeling Laws and Regulations"
4. State and Federal Legislative Outlook for 1961
5. Question and Answer Period

ROOF COATING AND ROOF CEMENT MANUFACTURERS' FORUM
10:00 A.M. Thursday, October 27
FRENCH ROOM—THE DRAKE HOTEL
Presiding: Paul B. Cefalu, Chairman
Southern Paint Products Co.
DISCUSSION SUBJECTS

"Asphalt Additives"
Thomas Mastin, The Lubrizol Corp.
"A New Development in Colored Aluminum Roof Coatings"
Fred Yenkin, The Yenkin-Majestic Paint Corp.

GLAZING AND CALKING COMPOUND MANUFACTURERS' SEMINAR
9:00 A.M. Friday, October 28
ROOM 18—THE DRAKE HOTEL
Presiding: Harry E. Hutson, Chairman
Gibson-Homans Co.

"Where Do We Go From Here"
Dr. R. M. Clewett—Dr. Lynn Stockman
School of Business—Northwestern University

TRADE SALES MANUFACTURERS' MANAGEMENT WORKSHOPS
9:30 A.M. Friday, October 28
THE DRAKE HOTEL
Parlors E, F & G

"Agressive Salesmenship"
Dr. Charles L. Lapp
Professor of Marketing—Washington University
Venetian Room
"Maintaining Markets in Today's Tough Competition"
J. R. Oliver, J. R. Oliver Associates
Registration Required for either Workshop

CHEMICAL COATINGS CONFERENCE
10:00 A.M.-5:00 P.M. Friday, October 28
FRENCH ROOM—THE DRAKE HOTEL

"TECHNICAL MANPOWER—HOW TO GET IT—HOW TO KEEP IT"
Moderator
J. A. Hager—Grand Rapids Varnish Corporation
Conference Participants
W. R. Barrett—Rinshed-Mason Co.
C. A. Brethren, Jr.—Wyandotte Paint Products Co.
A. W. Slocum—DeSoto Chemical Coatings, Inc.
H. J. Mather—Pittsburgh Plate Glass Co.
E. C. Kubicek—Illinois Institute of Technology
Open to all members

TRADE SALES FORUM
2:30 P.M. Friday, October 28
GRAND BALLROOM—THE DRAKE HOTEL

"LOST MARKETS—HOW TO REGAIN THEM"
Morris R. Wingfield, Presiding
Benjamin Moore & Co.
Interior Decorator
Mrs. Ellen L. McCluskey
Ellen L. McCluskey Associates, Inc.
Painting & Decorating Contractor
Mr. Ray N. Elvart
Ray N. Elvart & Company
Architect
Mr. Bruce Graham
Skidmore-Owings & Merrill
Open to all members

TRAFFIC FORUM
2:30 P.M. Friday, October 28
PARLORS E, F & G—THE DRAKE HOTEL

R. M. Boyd, Chairman NPVLA Traffic Committee
Pittsburgh Plate Glass Company
"Your Traffic Committee and How It Benefits You"
R. M. Boyd, Chairman, NPVLA Traffic Committee
"Modern Trends in Transportation"
C. S. Simpson, Traffic Manager, E. I. duPont de Nemours & Co.
"Organization and Value of a Company Traffic Department"
J. J. A. Winzenried, General Traffic Manager, Devoe & Raynolds Co., Inc.

GENERAL SESSION
9:30 A.M. Saturday, October 29
GRAND BALLROOM—THE DRAKE HOTEL
Presiding: Joseph F. Battley, President

Call to Order
Introduction of Guests
Painting and Decorating Contractors of America
Leon Switzer, President
Federation of Societies for Paint Technology
Eugene H. Ott, President-Elect
Presiding: J. V. Thompson, Chairman of the Board of Directors and Executive Committee
Committee Reports and Resolutions
Final Report of By-Laws Committee—Foster Miles, Chairman
Final Report of Nominating Committee—David H. Moran, Chairman
Election and Installation of Officers
Presiding: Joseph F. Battley, President
Introduction of Guest Speaker
"The Donkey—The Elephant—And Your Future"
Leo Cherne, Executive Director, Research Institute of America
Unfinished Business
New Business
Adjournment

RAYMOND C. ADAMS
President

Officers Federation of Societies for Paint Technology

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38th ANNUAL MEETING

EUGENE H. OTT
President-Elect

WILLIAM L. FOY
Treasurer

C. HOMER FLYNN
Executive Secretary

PROGRAM
38th FEDERATION ANNUAL MEETING

MONDAY, OCTOBER 31

9:30 38th Annual Meeting Opens
Invocation—Verne C. Bidlack, Federation Chaplain
In Memorium—Everitt J. Cole, Memorial Committee Chairman
Greetings and Introductions—Raymond C. Adams, President of the Federation of Societies for Paint Technology.
Greetings from the Canadian Paint, Varnish and Lacquer Assn.
Welcome—Thomas P. Moran, Host Committee Co-Chairman.

H. E. Hillman)-Presiding
H. C. Owens)

10:10 "Commercial Production of Isophthalic Acid Alkyd Resins"—C-D-I-C Society. (To be presented by William L. Foy).

10:30 "Evaluation of Leveling by a Drawdown Method"—New York Society. (To be presented by Fred B. Stieg, Jr.)

10:50 "A Study of Factors Affecting Rusting of Steel and Blistering of Organic Metal Coatings"—Pittsburgh Society. (To be presented by William Wettach)

11:10 "A Study of Pigmented Coatings for Application to Fiber Glass Products"—Northwestern Society. (To be presented by Owen Paukner)

11:30 Annual Meeting Keynote Address—E. Edgar Fogle, President of Union Carbide Chemicals Co. (Introduction by Raymond C. Adams, President of the Federation).

MONDAY AFTERNOON SESSION

J. J. Oates)-Presiding
W. H. Hoback)

1:50 "Gas Phase Chromatographic Examination of Chlorinated Solvents"—Baltimore Society. (To be presented by R. C. Crippen.)

2:10 Address by Joseph F. Battley, President of the National Paint, Varnish and Lacquer Assn.

2:30 "Infrared Spectroscopy, Its Use as an Analytical Tool in the Field of Paints and Coatings"—Chicago Society. (To be presented by Wallace H. Brown).

2:50 Invited Paper—"Physical Chemistry of Interfaces as Related to Coatings"—William C. Prentiss, of Rohm & Haas Co.

3:30 "Rheology"—A Panel Discussion.
W. K. Asbeck,
Moderator.....Union Carbide Chemicals Co.
"Fundamentals of the Rheology of Pigment Dispersions"
Donald W. Brookfield
The Brookfield Engineering Labs.
"Measurement of Rheological Properties".
Raymond L. Whitney.....National Lead Co.
"Practical Rheology—Painter's Point of View".

TUESDAY, NOVEMBER 1

W. M. Tomc)-Presiding
J. F. Rooney)

9:00 "Molybdate Pigments: New Corrosion Inhibitors"—Helmuth O. Schoen and Benson G. Brand. To be presented by Mr. Schoen. (A Roon Award Competition Paper).

9:20 "A Unique Alkyd Constant For Designing and Assessing Alkyd Formulations"—Temple C. Patton. (A Roon Award Competition Paper).

9:40 "Instrumentation in the Paint Industry"—APanel Discussion
Walter C. McCrone,
Moderator.....W. C. McCrone Associates
"Use of the Microscope in the Paint Industry"
Herman A. Liebhafsky.....General Electric Co.
"X-Ray Methods and the Paint Industry"
Nathaniel Brenner.....The Perkin-Elmer Corp.
"Applications of Instrumentation in the Paint Industry"

11:00 The Annual Joseph J. Matiello Memorial Lecture—"Philosophy of Coatings"—Henry F. Payne, Professor in Charge of Organic Coating Research and Technology, University of Florida. (Introduction by C. A. Aloia, Chairman of the Matiello Lecture Committee).

TUESDAY AFTERNOON SESSION

These Round Table Production Forums are informal discussions limited to an attendance of 25 people each. Only those pre-registered and possessing tickets of admission will be admitted.

1:30 "Straining, Filling, Labeling, and Casing"—Round Table Production Forum. (First Session). Moderated by Willard W. Vasterling, of Davis Paint Co.
"Raw and Finished Materials Handling"—Round Table Production Forum. (First Session). Moderated by James J. Foy, of Foy Paint Co.

3:15 "Straining, Filling, Labeling, and Casing"—Round Table Production Forum. (Second Session). Moderated by Willard W. Vasterling.
"Raw and Finished Materials Handling"—Round Table Production Forum. (Second Session). Moderated by James J. Foy.

WEDNESDAY, NOVEMBER 2

H. L. Fenburr)-Presiding
D. T. Rattray)

9:00 Invited Paper—"Fundamentals of Film Formation"—Turner Alfrey, Jr., of The Dow Chemical Co.

10:00 "Preparation and Properties of a Series of Polyesters"—Professor W. A. Mosher and Edmund A. Zaraglia, of the University of Delaware. To be presented by Prof. Mosher. (A Paint Research Institute paper).

10:30 "Minimum Film Thickness for Economical Protection of Hot Rolled Steel Against Corrosion" (Progress Report)—Professor Wouter Bosch, of the University of Missouri School of Mines and Metallurgy. (A Paint Research Institute paper).

11:00 Invited Paper—"Status of Color and Gloss Measurements in Industry"—Mark Morse, of E. I. duPont de-Nemours & Co., Inc.

11:40 Installation of Federation Officers for 1960-61. Open Meeting. Everybody welcome.

WEDNESDAY AFTERNOON SESSION

D. F. Koenecke, Presiding

2:00 "Paint Problem Clinic and Color Headaches"—Conducted by "Colonel" Billy Hood.

2:40 "Metal Protective Maintenance Painting"—A Panel Discussion
Joseph W. Tomecko, Moderator
Canadian Industries, Ltd.
Fletcher W. Shanks..U. S. Army Engineer District
"Maintenance Painting of Fresh Water Steel Structures"
R. P. Devoluy.....The Glidden Co.
"Maintenance Painting of Ocean Going Ships"
S. C. Frye.....Bethlehem Steel Co.
"Maintenance Painting of Structural Steel"

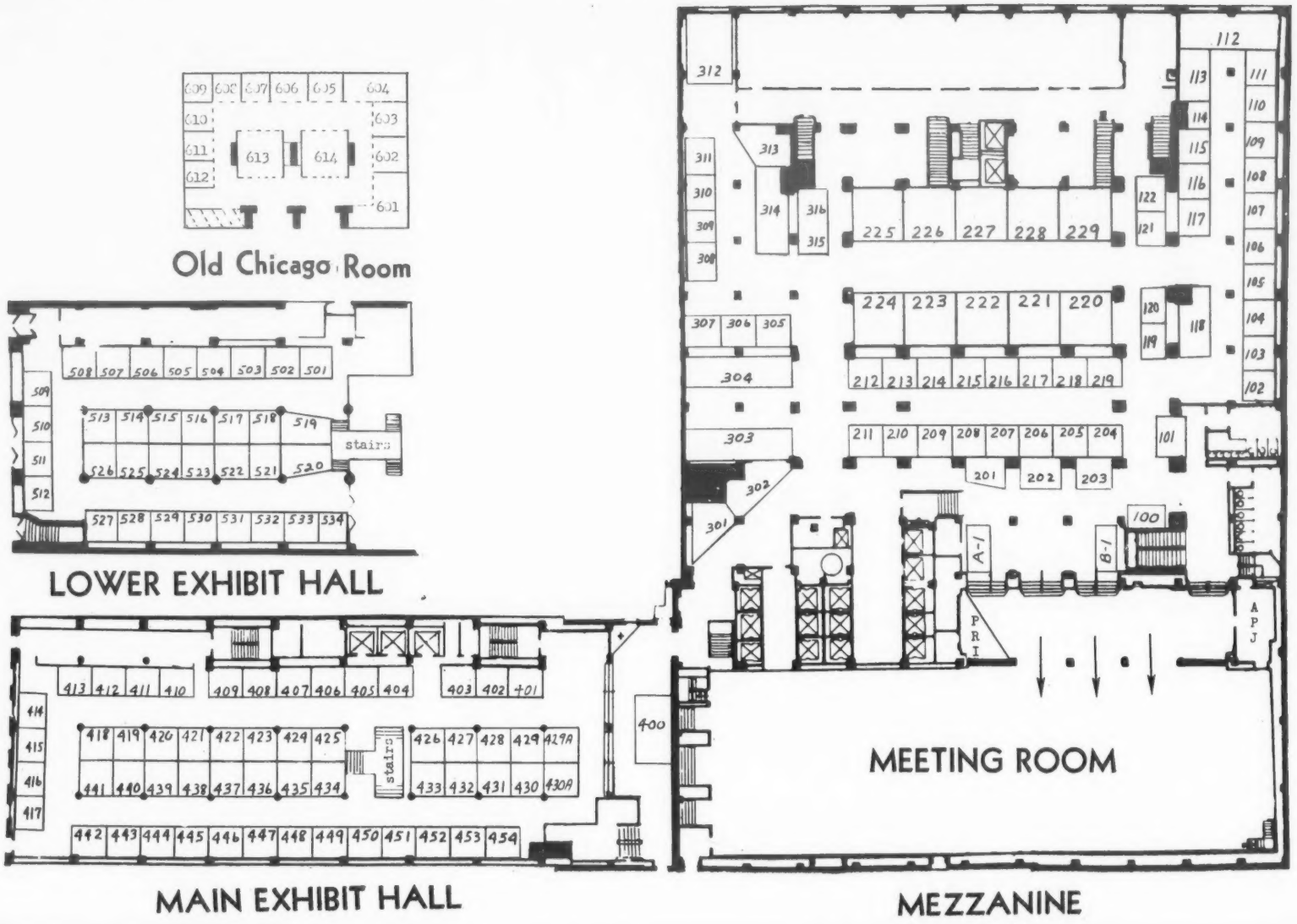
4:00 38th Annual Meeting Closes

REGISTRATION SCHEDULE

The Lobby, Hotel Sherman

Saturday, October 29	*10 to 5*
Sunday, October 30	*10 to 4*
Monday, October 31	*9 to 5*
Tuesday, November 1	*9 to 5*
Wednesday, November 2	*9 to 2*

FLOOR PLAN OF 1960 PAINT INDUSTRIES' SHOW



MEZZANINE

EXHIBITORS (A-Z)

COMPANY	BOOTH NO.
Abbe, Paul O., Inc.	203
Advance Solvents & Chemical Co.	440-41
Air Reduction Chemical Co.	602
American Zinc Institute, Inc.	A-1
Amoco Chemical Corp.	314
Anderson-Pritchard Oil Corp.	208
Archer-Daniels-Midland Co.	308-12
Armour Industrial Chemical Co.	529-30
Atlas Electric Devices Co.	509
Autoblend Products Co.	603
Baker Castor Oil Co.	101
Borden Chemical Co.	212-13
Brighton Corp.	513
Buckman Laboratories, Inc.	601
Cabot, Godfrey L., Inc.	306-07
Carbola Chemical Co.	519
Carbon Dispersions, Inc.	419
Cargill, Inc.	420-21
Catalytic Combustion Corp.	217
Celanese Chemical Co.	206-07
Cellofilm Industries, Inc.	313
Chicago Boiler Co.	524
Chisholm Ryder Co. of Pa.	112
Ciba Products Corp.	525-26
Colton Chemical Co.	450-51
Columbian Carbon Co.	204-05
Commercial Solvents Corp.	426-27
Daniel Products Co.	104
Davidson & Hemmendinger	100
Davison Chemical Co.	613
Day, J. H. Co.	517
Dewey & Almy Chemical Co.	610-12
Dow Chemical Co.	412-17
du Pont de Nemours & Co., Inc.	422-23
Eastman Chemical Products, Inc.	447-49
Enjay Chemical Co.	607-09
Epworth Manufacturing Co.	305
Firestone Plastics Co.	227
Gardner Laboratory, Inc.	108-09
General Aniline & Film Corp.	406-07
General Electric Co.	405
General Mills, Inc., Chemical Div.	121-22
General Tire & Ruber Co.	431
Georgia Kaolin Co	527
Glidden Co., Organic Chem. Div.	523
Goodyear Tire & Rubber Co.	428-29-29A
Harshaw Chemical Co.	452-54
Hercules Powder Co.	214-15
Heyden Newport Chemical Corp.	442-43
Hockmeyer, Herman & Co.	520-21
Hunter Associates Laboratory, Inc.	604
Imperial Color Chemical & Paper Corp.	105-06
Instrument Development Labs., Inc.	201
Interchemical Corp., Color & Chem. Div.	202
International Talc Co., Inc.	506
Johns-Manville Sales Corp.	408-09
Johnson, S. C. & Son, Inc.	528
Kent Machine Works, Inc.	425
Kohnstamm, H. & Co., Inc.	518
Lacquer Information Center	303-04
Lawter Chemicals, Inc.	110
Lehmann, J. M. Co., Inc.	501-02
Macbeth Daylighting Corp.	514
Marbon Chemical Division	515-16
Metalsalts Corp.	115
Metals Disintegrating Co., Inc.	400
Mineral Pigments Corp.	444
Minerals & Chemicals Corp. of America	614
Mobay Chemical Co	102-03
Monsanto Chemical Co.	532-33
Morehouse-Cowles, Inc.	510-12
Naftone, Inc.	113
National Aniline Div. Allied Chemical Corp.	430-30A
National Paint, Varnish & Lacquer Assn.	B-1
National Starch & Chemical Corp.	439
Neville Chemical Co.	404
Nuodex Products Co., Inc.	218-19
Olin Mathieson Chemical Corp.	605-06
Oronite Chemical Co.	220
Patterson Foundry & Machine Co.	432-33
Pennsylvania Ind. Chemical Corp.	216
Plastics & Coal Chemicals Div. Allied Chemical Corp.	118-20
Q-Panel Co.	534
Raybo Chemical Co.	117
Reichard-Coulston, Inc.	522
Reichhold Chemicals, Inc.	209-11
Rohm & Haas Co.	228-29
Ross, Charles & Son Co., Inc.	410
Ross & Rowe, Inc.	418
Shar Dispersion Equipment Co.	531
Shawinigan Resins Corp.	116
Shell Chemical Co.	223-26
Shell Oil Co.	221-22
Silberline Manufacturing Co., Inc.	504
Southwestern Engineering Co.	507-08
Spencer Kellogg & Sons, Inc.	401-03
Thibaut & Walker Co., Inc.	505
Trancoa Chemical Corp.	114
Troy Chemical Co.	107
Union Carbide Chemicals Co.	445-46
Union Carbide Plastics Co.	436-38
U.B.S. Chemical Co.	111
U.S. Stoneware Co.	302
Velsicol Chemical Corp.	315-16
Vulvan Associated Container Co.'s, Inc.	301
Washburn, T. F. Co.	424
Webster Equipment Co.	503
Williams, C. K. & Co.	411
Witco Chemical Co., Inc.	434-35

MAIN EXHIBIT HALL

EXHIBITORS (Booths 100-614)

A-1	American Zinc Institute, Inc.
B-1	National Paint, Varnish & Lacquer Assn.
100	Davidson & Hemmendinger
101	Baker Castor Oil Co.
102-03	Mobay Chemical Co.
104	Daniel Products Co.
105-06	Imperial Color Chemical & Paper Corp.
107	Troy Chemical Co.
108-09	Gardner Laboratory, Inc.
110	Lawter Chemicals, Inc.
111	U.B.S. Chemical Co.
112	Chisholm-Ryder Co. of Pa.
113	Naftone, Inc.
114	Trancoa Chemical Corp.
115	Metalsalts Corp.
116	Shawinigan Resins Corp.
117	Raybo Chemical Co.
118-20	Plastics & Coal Chemicals Div. Allied Chemical Corp.
121-22	General Mills, Inc., Chemical Div.
201	Instrument Development Labs., Inc.
202	Interchemical Corp., Color & Chem. Div.
203	Abbe, Paul O., Inc.
204-05	Columbian Carbon Co.
206-07	Celanese Chemical Co.
208	Anderson-Prichard Oil Corp.
209-11	Reichhold Chemicals, Inc.
212-13	Borden Chemical Co.
214-15	Hercules Powder Co.
216	Pennsylvania Ind. Chemical Corp.
217	Catalytic Combustion Corp.
218-19	Nuodex Products Co., Inc.
220	Oronite Chemical Co.
221-22	Shell Oil Co.
223-26	Shell Chemical Co.
227	Firestone Plastics Co.
228-29	Rohm & Haas Co.
301	Vulcan Associated Container Co.'s Inc.
302	U. S. Stoneware Co.
303-04	Lacquer Information Center
305	Eqworth Manufacturing Co.
306-07	Cabot, Godfrey L., Inc.
308-12	Archer-Daniels-Midland Co.
313	Cellofilm Industries, Inc.
314	Amoco Chemicals Corp.
315-16	Velsicol Chemical Corp.
400	Metals Disintegrating Co., Inc.
401-03	Spencer Kellogg & Sons, Inc.
404	Neville Chemical Co.
405	General Electric Co.
406-07	General Aniline & Film Corp.
408-09	Johns-Manville Sales Corp.
410	Ross, Charles & Son Co., Inc.
411	Williams, C. K. & Co.
412-17	Dow Chemical Co.
418	Ross & Rowe, Inc.
419	Carbon Dispersions, Inc.
420-21	Cargill, Inc.
422-23	du Pont de Nemours & Co.
424	Washburn, T. F. Co.
425	Kent Machine Works, Inc.
426-27	Commercial Solvents Corp.
428-29-29A	Goodyear Tire & Rubber Co.
430-30A	National Aniline Div. Allied Chemical Corp.
431	General Tire & Rubber Co.
432-33	Patterson Foundry & Machine Co.
434-35	Witco Chemical Co., Inc.
436-38	Union Carbide Plastics Co.
439	National Starch & Chemical Corp.
440-41	Advance Solvents & Chemical Co.
442-43	Heyden Newport Chemical Corp.
444	Mineral Pigments Corp.
445-46	Union Carbide Chemicals Co.
447-49	Eastman Chemical Products, Inc.
450-51	Colton Chemical Co.
452-54	Harshaw Chemical Co.
501-02	Lehmann, J. M. Co., Inc.
503	Webster Equipment Co.
504	Silberline Manufacturing Co., Inc.
505	Thibaut & Walker Co., Inc.
506	International Talc Co., Inc.
507-08	Southwestern Engineering Co.
509	Atlas Electric Devices Co.
510-12	Morehouse-Cowles, Inc.
513	Brighton Corp.
514	Macbeth Daylighting Corp.
515-16	Marbon Chemical Division
517	Day, J. H. Co.
518	Kohnstamm, H. & Co. Inc.
519	Carbola Chemical Co.
520-21	Hockmeyer, Herman & Co.
522	Reichard-Coulston, Inc.
523	Glidden Co., Organic Chem. Div.
524	Chicago Boiler Co.
525-26	Ciba Products Corp.
527	Georgia Kaolin Co.
528	Johnson, S. C. & Son, Inc.
529-30	Armour Industrial Chemical Co.
531	Shar Dispersion Equipment Co.
532-33	Monsanto Chemical Co.
534	Q-Panel Co.
601	Buckman Laboratories, Inc.
602	Air Reduction Chemical Co.
603	Autoblend Products Co.
604	Hunter Associates Laboratory, Inc.
605-06	Olin Mathieson Chemical Corp.
607-09	Enjay Chemical Co. Div. Humble Oil & Refining Co.
610-12	Dewey & Almy Chemical Co.
613	Davison Chemical Co.
614	Minerals & Chemicals Philipp Corp.

EXHIBITORS' DIRECTORY

Hotel Sherman, Chicago

EXHIBIT HOURS

Saturday, October 29	Noon to 5:00
Monday, October 31	9:00 to 6:00
Tuesday November 1	9:00 to 5:00
Wednesday November 2	9:00 to 3:00

Booth No.

PAUL O. ABBE, INC. 203
Little Falls, N. J.
Ball and pebble mills, mixers, and laboratory units.
Garlick Ringer Hawkinson Pulsifer
— See Advertisement Page 53 —

ADVANCE SOLVENTS & CHEMICAL 440-41
Div. of Carlisle Chemical Works, Inc.
New Brunswick, N. J.
Emulsifying agents for linseed oil house paints, additives for latex emulsions, line of driers and additives
Gregg Tucker Frankel Burger
Ralston
— See Advertisement Page 157 —

AIR REDUCTION CHEMICAL CO. 602
A Div. of Air Reduction Co., Inc.
New York 17, N. Y.
Monomers for vinyl latex emulsion, exterior application of PVAc paints, information on vinyl acetate, vinyl stearate, polyvinyl alcohol, acetylenic alcohols, and Surfynol surface active agents
Tinnon Cole Herman Blades
Gilardi Beck Smith
— See Advertisement Page 48 —

AMERICAN ZINC INSTITUTE, INC. A-1
Result of two year inspection of nation-wide testing program on the use of zinc oxide in various paints
Larson Whitford Stephenson Werthan
Reising Pepper Walrond Wilkinson
Pettigrew Adams

AMOCO CHEMICAL CORP. 314
Chicago 80, Ill.
Isophthalic acid, phthalic anhydride, trimellitic anhydride, hydrocarbon resins, polybutenes
Amos Brooks Bruggeman Carlsen
Cassis Connell Eiszner Elliott
Gordon Holdridge Hubbard Lorenz
Manning Moulton Parkinson Pearcy
Perkins Pressly Rhoades Trogden
Wagner Weisz Wilkinson
— See Advertisement Pages 130, 131 —

ANDERSON-PRICHARD OIL CORP. 208
Oklahoma City, Okla.
Use and information on APCO line of thinners
Bettis Cotter Gault Johnson
Rooney Rubek

Booth No.

ARCHER-DANIELS-MIDLAND CO. 308-12
Minneapolis, Minn.
Aroflint 2-component system 505 for industrial and trade sales finishes; Arolon 310, exterior emulsion; Arolon 1001, water soluble resin; Aroplaz 1221, isophthalic tall oil resin; Aroplaz 6102, baking finish; Aroplaz, fast-drying alkyd, Arolon 210, exterior emulsion
Mueller Koehler Garfield Hjortland
Foster Davidson Andrews Eberman
Lowe Blakely Baruch Wilhelm
Porter Benton Nelson R. Price
Sklarz Bader Burnett Blegen
Boller Graver Curtice Olson
Woodward Lubman Konen Mills
Brode Drake Parson Strickland
Smith Erlandson West Dearing
L. Price Cooke Cabot Bourassa
King Sedgwick Decker Engal
Coats Billiat Bulgozdy
— See Advertisement Pages 32, 33 —

ARMOUR INDUSTRIAL CHEMICAL CO. 529-30
Chicago 6, Ill.
Aliphatic nitrogen chemicals in finishes, enamels and latex paints
Strain Evanko Dybalski Michals
Warner Sindewald

ATLAS ELECTRIC DEVICES CO. 509
Chicago 13, Ill.
New model 60-W Xenon Arc Weather-Ometer
Alport Lane Metzinger Norton
— See Advertisement Page 154 —

AUTOBLEND PRODUCTS CO. 603
San Francisco, Calif.
Color guns, manual and powered agitation-dispensing units
Stiles O'Neil

BAKER CASTOR OIL 101
Bayonne, N. J.
Castor oil derivatives in urethane finishes, suspension and sag control exhibit, improving adhesion of latex paints to chalky surfaces.
Hayes Jubanowsky Bolley Patton
Frank Rulison Ottens Swensen
— See Advertisement Page 28 —

Booth No.

BORDEN CHEMICAL CO. 212-13
New York 17, N. Y.
Acrylic, polyvinyl acetate and butadiene-styrene emulsions, and polyvinyl alcohol, exposure data and recommendation of polyvinyl acetate copolymer and acrylic copolymer for exterior application.
Smith Wakefield Driscoll Letourneau
Becker Gordon Pearlman Sanfilippo
Wezowicz Young

BRIGHTON CORP. 513
Cincinnati 4, Ohio
Display photos of laboratory, pilot and production size resin reactor units
Steioff Hext
— See Advertisement Page 161 —

BUCKMAN LABORATORIES 601
Memphis 8, Tenn.
Bactericide, Busan-11 and M1
Stitt Ross Wienert
Rogers Weiss

CABOT CORP. 306-07
Boston 10, Mass.
Cabosil, Silica Cabolite, Wollastonite, Carbon Blacks
Berstein Carpenter Clark Donohue
Goulston Marsh McGonigle McNeil
Parsons Roemelt Slade Virtue

CARBOLA CHEMICAL CO., INC. 519
Natural Bridge, N. Y.
Test fence results of exposure panels on house paint formulated with Asbestol Regular and Superfine, also Micro Velva A and L.
Koenig Bonner Brown Roast
Spriggs

CARBON DISPERSIONS, INC. 419
Newark 12, N. J.
Carbon and lampblack dispersions, selected color dispersions
A. Brauch E. Brauch Keegan Somers
— See Advertisement Page 183 —

CARGILL, INC. 420-21
Minneapolis 15, Minn.
Linseed oils, soybean oils, alkyd resins, polyurethanes, isophthalic resin emulsion, water soluble industrial resins
Klobe Stanton Martin Wiff
Kenefick Knott Kamen Shelby
Spitz Donnelly Rogaliner Reutz
Simmonds Schembri Crocker Spindler
— See Advertisement Page 38 —

CATALYTIC COMBUSTION CORP. 217
Detroit 8, Mich.
Catalytic fume combustion systems; catalytic infrared laboratory unit.
R. Ruff D. Ruff Brewer
Hutchison Donahue

CELANESE CHEMICAL CO. 206-07
New York 16, N. Y.
Monomers, Polymers, Emulsions, Solvents, Plasticizers
Kampschulte Hecht Bartley Baker
Davis Smith Melvin Ball
Weich Polacek Swanezy Couser
Mamola Lumley Shea Magnuson
Kagan Petisi
— See Advertisement Page 50 —

CELLOFILM INDUSTRIES, INC. 313
Wood-Ridge, N. J.
Features display finished goods manufactured from company products, information on solids-viscosity relationships.
Golden Eysmann
— See Advertisement Page 44 —

Booth No.

CHICAGO BOILER CO. 524
Chicago, Ill.
Sand grinders (large and small models)
Krumholz Quackenbush Pirok

CHISHOLM-RYDER CO. OF PENNA. 112
Hanover, Pa.
Roller storage feed table, gallon can hand packer, liquid filling machines
Abendschein Severson J. Louderman R. Louderman

CIBA PRODUCTS CORP. 525-26
Fair Lawn, N. J.
Epoxy resins and pigments
Busker Davis Dorman Gruber
Ibsen Johnson Joseph Pschorr
Robinson Senseman Thompson Weschler
Lawrence Osolin Penaud

COLTON CHEMICAL CO. 450-51
Cleveland, Ohio
Exterior exposures of house paints made with Flexbond.
Krashin Ames Jaffe Kaine
Fickenscher Newman Cummins Coff
Greenfield Hagemeier
— See Advertisement Page 176 —

COLUMBIAN CARBON CO. 204-05
New York 17, N. Y.
Carbon black and carbon black dispersions. Mapico pure synthetic iron oxides—reds, yellows, browns, tans; low opacity iron oxides (yellow and red)
Bryant Snyder Peters Seles
Katona Downs Tudder Kocik
Buehrle Loges Kitzmiller Bosworth
Berberian Brannan
— See Advertisement Page 49 —

COMMERCIAL SOLVENTS CORP. 426-27
New York 16, N. Y.
Nitropropane in solving formulation problems in protective coatings.
Maple Hennessey Luedke Burch
Pontow Hallock DiGiacomo Mohrman
Danielson Short Seifert Bennett
Crawford Holscher Field Fowler
Tislow Sutton Lentine Fries
O'Connor Giovine
— See Advertisement Page 41 —

DANIEL PRODUCTS CO. 104
Jersey City, N. J.
Dispersed colors, dispersed flatting bases, Carbazole violet, Quinacridone (Monastral) violet and red dispersions, new mar and polish resistant flatting base for lacquers and synthetics
Daniel Cohen

DAVIDSON AND HEMMENDINGER 100
Easton, Pa.
Colorant Mixture Computer and Color Difference Computer
Davidson Landry

DAVISON CHEMICAL DiV. 613
W. R. Grace & Co.
Baltimore, Md.
Syloid Silicas (finely divided silicous materials) as flatting agents
Barrett Carver Seybert Kunkowski

J. H. DAY CO. 517
Div. of Cleveland Automatic Machine Co.
Cincinnati 12, Ohio
Model M-36 Hy-R-Speed Mill and Model 100 and 225 Daysolver
Weil LeBlond Wershay Grobe
Lockhart Flowers Miller Allison

Booth No.

DEWEY & ALMY CHEMICAL CO. 610-12
W. R. Grace Co.
Cambridge 40, Mass.
PVAc emulsion including gelled paint, Christmas tree paint, stipple and texture paint, wallpaper coatings, acoustic tile finish, composition board primers, roof coatings and fabric coatings
Broughton Miner Baracani Burr
Patrick Sale Scheufele Morton
Kaalstad

DOW CHEMICAL CO. 414-417
Midland, Mich.
Interior latex paints and exterior latex house paints, industrial latex paints, epoxy resins, vinyl resins, styrene and vinyltoluene monomers, acrylic acid, and ester monomers, latexes and epoxy resins for cement, factory-applied intumescent coatings
Morand Peterson Witt A. Drubel
Parker Huffman Lalk R. Drubel
Brown Hill
— **See Advertisement Page 46** —

E. I. duPONT de NEMOURS & CO., INC. 422-23
Elastomer Chemicals Dept.
Wilmington 98, Del.
Protective coatings based on neoprene, "Hypalon" synthetic rubbers and "Hylene" organic isocyanate
Kelly McSweeney Santora Remington
Leiberman Burins Abernathy

EASTMAN CHEMICAL PRODUCTS, INC. 447-49
Kingsport, Tenn.
Latest developments in butyrate lacquer technology
Sanders Gearhart Campbell Ball
Abernathy Ogdin Dubberly Langston
Fayssoux Mahaffey Francisco Morrow
DeCroes Cox Lee Hawes
Johnston Cooke Moore Crowley
Coney Teague Davis Atkins
— **See Advertisement Pages 43, 60** —

ENJAY CHEMICAL CO. 607-09
Div. of Humble Oil & Refining Co.
New York, N. Y.
Solvents and Buton Resins
Production managers of eastern, central and western divisions, and technical representatives.
— **See Advertisement Page 85** —

EPWORTH MANUFACTURING CO. 305
South Haven, Mich.
Ball and pebble mills, tanks, mixers
Zink Jeanne

FIRESTONE PLASTICS CO. 227
Pottstown, Pa.
Firestone Technical service exhibit, exterior test fence farm, latexes, vinyl solutions and dispersions
Rosenson Walker Edwards
Stevens Park Finkbiner

GARDNER LABORATORY, INC. 109-09
Bethesda, Md.
New color differential meter, laboratory instruments, apparatus and glassware
Sales and technical representatives

GENERAL ANILINE & FILM CORP. 406-07
Dyestuff & Chemical Div.
New York 14, N. Y.
Dispersed pigments, ultraviolet light absorbers, and acetylene derivatives
Gannon Katz Dalton Smock
Weth Day Sanchirico Buchne
Hyat
— **See Advertisement Pages 11-14** —

Booth No.

GENERAL ELECTRIC CO. 405
Chemical Materials Dept.
Pittsfield, Mass.
Methylon Coating Resins
Bzdula Chase Harris Nelson
Singer Steemstrup A. C. Wymore

GENERAL MILLS, INC. 121-22
Chemical Div.
Kankakee, Ill.
Polyamide resins, curing agents, epoxy resins
deMeurisse Kron Weigmann Christiansen
Sundberg Ness Price Johnson
Vincent Hanson Floyd

GENERAL TIRE & RUBBER CO. 431
Chemical Div.
Akron 9, Ohio
Latex emulsion systems of styrene-butadiene and styrene-acrylic for trade sales and specialty industrial coatings
Boruff Deckel Kreider
Nathan Phillips Hackim
— **See Advertisement Page 15** —

GEORGIA KAOLIN CO. 527
Elizabeth N. J.
Hydrite (hydrated aluminum silicates), Glomax (calcined aluminum silicates) and gloss and sheen control agent, Hydrite MP
Murchison Gans Larson Compton
— **See Advertisement Page 184** —

GLIDDEN CO. 523
Chemicals Div., Organic Chemical Dept.
Jacksonville, 1, Florida
Sylfat 500—Tall oil fatty acid in architectural alkyds, baking enamels, short oil alkyds, epoxidized esters, stabilizer for vinyls
Wells Eick Ekhom Taylor

COODYEAR TIRE & RUBBER CO. 428-429A
Ghemical Div.
Akron 16, Ohio
Vitel PE200, polyester coating resin in metal and wood finishes, inks, laminating adhesives, paper coatings. Pliolite AC, acrylate copolymer resin for industrial enamels, metallic and fluorescent paints, aerosol sprays, multicolor paints, traffic paints.
Thies Hunter Hoffman Zimmer
Workman Neese Jenkins Houlette
McNeer Williams Mayfield
Warner Barnum Smith
Bear Drexler Weldon

HARSHAW CHEMICAL CO. 452-454
Cleveland 6, Ohio
Meletex driers, yellow and red cadmium lithopones, Sun Yellow C and N, organic pigments, color dispersions, Kentucky inorganics
Bonnie Fritch Close Dickenson
Harris Molinari Lucht Juredine
Foote Shirey Connell Folsom
Stacey Straka Unkefer
— **See Advertisement Page 59** —

HERCULES POWDER CO. 214-15
Wilmington, Del.
Natrosol (thickener, stabilizer, etc.) Tall oil fatty acids, synthetic resins, pentaerythritol, cellulosic resins chlorinated rubber.
Representatives from all departments.
— **See Adventure Page 172** —

Booth No.

HEYDEN CHEMICAL DIV. 442-43
Heyden-Newport Chemical Corp.
New York, N. Y.
Maleic Anhydride, fumaric acid, Pentaerythritol alkyd combinations
Brown Doroskin Kraft Rice
Risch Roberts
— See Advertisement Page 91 —

HERMAN HOCKMEYER AND CO. 520-21
Bronx 1, N. Y.
High Speed Disc Perser (Manual and Hydraulic) and Heavy Duty Paste Mixer for Mastic Materials.
Klein Baker Slattengren
Hockmeyer Hereley Schabel
— See Advertisement Page 146 —

HUNTER ASSOCIATES LABORATORY, INC. 604
McLean, Va.
Distinctiveness of Image Glossmeter, Multipurpose Glossmeter, Color Difference Meter
Spicer Hunter

IMPERIAL COLOR CHEMICAL & PAPER 105-06
Dept. of Hercules Powder Co.
Glens Falls, N. Y.
Chemical pigment colors—hansa yellows, aqueous dispersions, Mercadium reds and maroons
Putnam Wakefield Sherman Tune
Bishop deRavignon Cooper Goble
Johannisson Long Menzies Brower
Green Thumser Ray
— See Advertisement Page 163 —

INSTRUMENT DEVELOPMENT LABS. INC. 201
Attleboro, Mass.
Model "D" Color-Eye-16 point abridged spectrophotometer
McGinn Johnson Munhall Hall
— See Advertisement Page 187 —

INTERCHEMICAL CORP. 202
Color & Chemicals Div.
Hawthorne, N. J.
White panels and electron micrographs showing that hiding, tint strength and gloss increases with decrease in average pigment particle size; carbon black panels illustrating R-B-H dispersions of carbon blacks
Craft Lynch Steiding Galowitsh
Gollan Remacle Clanton Bresky
— See Advertisement Page 133 —

INTERNATIONAL TALC CO., INC. 506
New York 6, N. Y.
Line of extender pigments: Asbestine 425 and 625 (stir-in pigment)
McCarthy Kuehl Smart Biggio
Paterson
— See Advertisement Page 95 —

JOHNS-MANVILLE SALES CORP. 408-09
New York, N. Y.
Extender pigment Micro-Cel T-38 for emulsion paints, Celite extender pigments
Martinson Cipolla Kranich
— See Advertisement Page 66 —

JOHNSON, S. C. & SON, INC. 528
Racine, Wis.
DPA and derivatives
Woodruff Lahiff Schultz

SPENCER KELLOGG AND SONS, INC. 401-03
Buffalo 5, N. Y.
One-can stable polyurethane, linseed oil, water dispersible lecithin and water soluble linseed oil vehicle
Healy Tarrant Beyer Terrill
Farstad Smith Bristol Turve
Bieneman Burdick James Willis
Bayer Weiffenbach Harris Burley
Engel
— See Advertisement Page 73 —

KENT MACHINE WORKS, INC. 425
Brooklyn 1, N. Y.
Three roller mill with transfer blade
De Senna Lentini
— See Advertisement Page 164 —

PVP Golden Anniversary

Booth No.

H. KOHNSTAMM & CO., INC. 518
New York 7, N. Y.
Organic and Inorganic pigments, certified lake pigments for non-toxic coatings, Kodis Universal concentrates
Coplan Dunn Kohnstamm Torter
R. Pulver J. Pulver Nelson

LACQUER INFORMATION CENTER 303-04
Latest developments in lacquer technology, formulation and applications
Celanese Chemical Co. Columbia Carbon Co.
Enjay Chemical Co. Hercules Powder Co.
Monsanto Chemical Co. Sandoz, Inc.
Shell Chemical Corp. United States Steel Corp.

LAWTER CHEMICALS, INC. 110
Chicago 45, Ill.
HI-VIZ fluorescent pigments, resins including phenolics modified phenolics, maleic and specialty resins
Ferguson Heath Hacker Antonak

J. M. LEHMANN CO., INC. 501-02
Lyndhurst, N. J.
Display of paint manufacturing equipment, Vorti-Siv machine, automatic coding unit and paint mill
Muller Grale Mierswa
— See Advertisement Page 8 —

MACBETH DAYLIGHTING CORP. 110
Newburgh, N. Y.
Examolite Model EBX-222 color corrected light; color matching skylights
Kallevang Meeker

MARBON CHEMICAL DIV. 515-16
Borg-Warner Corp.
Washington, W. Va.
Mineral spirits soluble 1100 TMV resin for multicolor wall paints, floor paints, high-temperature aluminum paint, metal primers, floor marking paint and quick drying enamels
Smith O'Connell McCurdy Kain
Hayden Mundinger Watt Scott
Levine
— See Advertisement Page 40 —

METASOL DIV. 115
Metalsalts Corp.
Hawthorne, N. J.
Bactericide-fungicide (Metasol 57) in oil, alkyd, acrylic, PVAc, styrene-butadiene, etc., phenylmercurials.
Waite Fallon Ramp Grier

METALS DISINTEGRATING CO. 400
Elizabeth, N. J.
Metallic flake pigments in automotive finishes and aluminum and gold bronze flake pigments
Cliffe Houy Knoll McKinley
Town
— See Advertisement Page 74 —

MINERAL PIGMENTS CORP. 444
Muirkirk, Md.
Color paste made with Universal tinting vehicle
Scowe Devine Weisberg Libby

MINERALS & CHEMICALS PHILIPP CORP. 614
Menlo Park, N. J.
Effects of various inerts on hiding power and contrast ratio in latex paint systems
Blake Hempel Smith Wert
Lidon Wheeler Ferrigno
— See Advertisement Page 10 —

MOBAY CHEMICAL CO. 102-103
Pittsburgh 5, Pa.
100 percent solids urethane systems, urethane oils, isocyanate resins
Fox Wells Hudson
Malone Gahagan

Booth No.

MONSANTO CHEMICAL CO. 532-33
Plastics Div.
Springfield, Mass.
Lytron 680, interpolymer latex for exterior paint, styrene latices, amino and phenolic resins.
Boles, Brown, Casey, Cipriano, Cochran, Handy, Watt, Hahn, Elmer, Francis, Gordon, Green, Haselton, Macpherson, Bueker, Orr, Wilson, Newcomb, Parker, Richter, Rohlfing, Schmidt, Stamp, Swan, Traverso, Rider

MOREHOUSE-COWLES, INC. 510-12
Los Angeles 65, Calif.
Latest models of Cowles-Dissolver and Morehouse mills
Smoot, McCullough, Morehouse, Purcell, Missbach, Meyer

NAFTONE, INC. 113
New York 22, N. Y.
Driers, polyester resins, driers for latex paints, anti-skinning agents, fungicides, lecithin for oil and latex paints, latex base, chlorinated rubber, 2-component catalyst spray gun
Lilla, Martin, DiPasquale, Smith
— See Advertisement Pages 36, 37 —

NATIONAL ANILINE DIV. 430-30A
Allied Chemical Corp.
New York, N. Y.
Quality improvement of raw materials offered to the paint industry, new pigment from Harmon Colors
Representatives from resin chemicals dept. and Harmon Colors.
— See Advertisement Page 86 —

NATIONAL PAINT, VARNISH AND LACQUER ASSOC. B-1
Washington, D. C.
Display of selected services available to members
Representatives from Washington office.

NATIONAL STARCH AND CHEMICAL CORP. 439
New York 17, N. Y.
Vinyl latex for fire-retardant paints, and Vinyl-Acrylic 2243 for exterior latex paint
Thune, Zahrndt, Juenger, Battaglia, Burke, Murphy, Liberti, Reiter, Steed
—See Advertisement Page 96 —

NEVILLE CHEMICAL CO. 439
Pittsburgh 25, Pa.
Cammarone-indene and petroleum hydrocarbon resins, solvents and plasticizers
Craig, Villing, Isenberg, Steen, Wheeler, DeBlander

NUODEX PRODUCTS CO. 218-19
Elizabeth, N. J.
Driers, fungicides, pigment dispersant, bodying agents, antiskinning agents, mixing and milling aids, stearates, aqueous additives, anti-foaming agents
Beyer, Kaiser, Schaeffer, Clark, Minich, Seymour, Dwyer, Price, Stewart, Houston, Ritter

OLIN MATHIESON CHEMICAL CORP. 605-06
New York 22, N. Y.
Mathieson chemicals for paint products
Barns, Drummond, Gower, Hawkins, Hovey, Malcolm, Materese, McKinney, McNeill, Moran, Schrouf, Zeller

ORONITE DIV. 220
California Chemical Co.
San Francisco, Calif.
Maleic anhydride, fumaric acid, isophthalic acid
Bailey, Colaianni, F. Peterson, Sonet, Billing, Gould, H. Peterson, Van Buskirk, Bolens, Johnson, Pollack, Stull, Burke, Lansing, Stephenson

Booth No.

PATTERSON FOUNDRY AND MACHINE CO. 432-33
East Liverpool, Ohio
Ball mill model, portable mixers, variable speed portable mixer, ceramics
Heddleston, Rahter, Stephenson, Witherow, Guiliani, Dilg, Gantt
— See Advertisement Page 3

PENNA. INDUSTRIAL CHEMICAL CORP. 216
Clairton, Penna.
Piccopale emulsions in latex paints, Piccolastic Resin in epoxy coatings and in bronzing liquids, Piccopale resins in alkyd enamels, Picco resins in aluminum vehicles, and information on Piccolyte resins
Hollis, Kinny, Young, Stack, Davis, Shumar, Sharrocks, McCormley
— See Advertisement Page 26 —

PLASTICS & COAL CHEMICALS DIV. 118-20
Allied Chemical Corp.
New York, N. Y.
Phthalic anhydride, Elastex plasticizers, solvents, glycols, Cumar resins, alkyd copolymers, 3725 general purpose resin, melamine resin for auto finishes, acrylic-alkyd copolymers
Caumann, Delaney, Johnson, Jannason, Cislo, McDonald, Pitcher, DeVore, Carney, Tufts, Shand, Boardman, Wyszynski
— See Advertisement Pages 16, 17, 58 —

Q-PANEL CO. 534
Cleveland 11, Ohio
Steel, aluminum and special alloy panels, phosphated coated panels
G. Grossman, P. Grossman

RAYBO CHEMICAL CO. 117
Huntington, W. Va.
Paint Additives
Hepner, Conner

REICHARD-COULSTON, INC. 522
New York, N. Y.
Iron oxide pigments in multicolor lacquers, primers and enamels
Burns, Smith, Casey, Treade, Coulston, Woodruff, Pursley

REICHHOLD CHEMICALS, INC. 209-211
White Plains, N. Y.
Epoxy resins, amino resins, acrylic solutions, polyester resins, styrenated alkyds, alkyd and acrylic emulsions and PVAc emulsions
Knauss, Hafeli, Gronet, Brown, Feld, Slootmaker, Drake, Wilson, Baran, Weismann, Rockenbach, Weinmann, Urich, Baker, Fay, Bloomquist
— See Advertisement 2nd Cover —

ROHM AND HAAS CO. 228-229
Philadelphia, Pa.
Acrylic coatings and emulsions, new thermosetting acrylic emulsion, new thermosetting acrylic solution resin
Adamson, Chatham, Garrett, Hartzell, Lesnefsky, Starkey, Wallman, Alcorn, Colby, Gibson, Kennady, Lyons, Timmons, Weiss, Allyn, Collins, Graeff, Keyser, Prentiss, Toussaint, Wetzel, Bretl, Elliott, Harland, Klein, Robinson, Urguhart, Wight
— See Advertisement Page 4 —

CHARLES ROSS & SON CO., INC. 410
Brooklyn 5, N. Y.
High-speed disperser, high speed three roll mill, paste mixer, pony mixer, double planetary mixer
Ross, Muller, Kennedy
— See Advertisement Page 160 —

ROSS & ROWE, INC. 418
New York 7, N. Y.
Use of lecithin in various paint applications
Schlesinger, Hilty, Lynch, McAuley

Booth No.

SHAR DISPERSION EQUIPMENT CO., INC: 531
Fort Wayne, Ind.
20 horsepower and lab model disperser
Schmitt Hoffman Rigel Hart

SHAWINIGAN RESINS CORP. 116
Springfield 1, Mass.
Gelva, polyvinyl acetate emulsions in paints, polyvinyl acetal resins, Butvar and Formvar in the manufacture of metal finishes and wood finishes
Bromley Finsilver Roth Poole
Kocher Porter Manning
— **See Advertisement Page 30** —

SHELL CHEMICAL CO. 223-26
New York, N. Y.
Pent-Oxone and Pent-Oxol solvent in surface coatings; epoxy resins in coating applications
Butler Scherzinger Mims Nauman
Havlik Brice McKenzie Ottens
Parrott Goffeney Haverkost Plizspa
Rees Snedden Howard Waters
Bayes Bradley Brady Brown
Davis Dickerson Dunbar Edwards
Herr Jones Klarquist Maybee
McConnel Miller Mullaly Neely
Parker Petersen Raudsch Reider
Seppala Somerville Stetts Velten
— **See Advertisement Page 6** —

SHELL OIL CO. 222
New York, N. Y.
Shell Evapo-Rater-for determining relative evaporation rates of petroleum solvents
Preu Ferrucci Gilbert Sliwa
Conn Larsen Irwin Pugh
Erickson Landis Carnahan Casillas
Wulff Kingsbury Niedermeier Duncan
Starke Sedlak Potts
— **See Advertisement Page 31** —

SILBERLINE MANUFACTURING CO., INC. 504
Stamford, Conn.
Non-leafing aluminum pigments for industrial finishes
Scheller Usowski Smith

SOUTHWESTERN ENGINEERING CO. 507-08
Los Angeles 58, Calif.
Production and laboratory size SWECO Vibro-Energy grinding mills
Wright Ficery Sjogren Kenagy

THE THIBAUT & WALKER CO. 505
Newark 1, N. J.
Coatings ranging from oleresinous finishes to alkyds; copolymer vinyl acetate-acrylic emulsions
Dunn Parker Sigafoose Edelstein
Stein Nortman

TRANCOA CHEMICAL CORP. 114
Reading, Mass.
Polyurethane resins
Connell McAllister

TROY CHEMICAL CO. 107
Newark, N. J.
New grinding and, "Colloidisperse #3"
Singer Goll O'Shea Sockloff
Withington Singer Snyder
— **See Advertisement Page 139** —

U B S CHEMICAL CO. 111
Cambridge, Mass.
U-7001 Ubatol for gloss-latex paints
Perry Smith Taitel King
Rishton Muskacsy Conig

UNION CARBIDE CHEMICALS CO. 445-46
Div. of Union Carbide Corp.
New York 17, N. Y.
NIAX Polyethers, catalysts, solvents for polyurethane coatings; monomers, thickeners, surfactants, coalescing aids and freeze-thaw stabilizers for latex paints; epoxy coating systems based on UNOX epoxides; and lacquer solvents
Technical representatives from the Central Division; technical specialists from New York and Technical Service Laboratory in Tarrytown, New York
— **See Advertisement Page 100** —

PVP Golden Anniversary

Booth No.

UNION CARBIDE PLASTICS CO. 436-38
New York 17, N. Y.
Vinyl solution and dispersion resins, coatings for aluminum house siding, phenolic and epoxy varnishes, vinyl latexes, phenolic cold-blended varnishes, new epoxy cooking technique
G. Young Maines Shoemaker Weis
Hanrahan McCurdy Fryman Dinwiddie
Behrens Letizia Bertics Welch
Annonio Boyd Bruce Calsibet
Goddard Greenhood Gulick Knowles
McKnight McLaughlin Schaufelberger Schwahn
E. Young Wood Westerman Joslin
Bisson Martell Ingram Callas
Nelson Halvorsen Condon Foxlee
McCullough Sullivan Wertz
— **See Advertisements Pages 18, 19, 64, 65** —

U. S. STONEWARE CO. 302
Akron 9, Ohio
Mill jars, grinding media, grinding and mixing equipment, ball mills, jar mills, drum tumblers, drum rollers
Farkas Scales Gomoll Wybel
— **See Advertisement Page 148** —

VELSICOL CHEMICAL CORP. 315-16
Chicago 11, Ill.
Hydrocarbon resin emulsions in trade sales and specialty coatings including fluorescent paints. Use of hard resins in traffic paints, multi-color finishes, and general varnish and vehicle
Burns Conor Drake Freedman
Lukas Mayer Meendsen Schor
— **See Advertisement Page 47** —

VULCAN ASSOCIATED CONTAINER CO's, INC. 301
Birmingham, Ala.
Steel pails and drums features: Hi-Bake Linings, Lithographed types; plastic bail handle grip
Zuck McCarthy Lynch Ryan
McTavey Little Bernecker Fagot
Chandler Findley
— **See Advertisement Front Cover** —

T. F. WASHBURN CO. 424
Chicago 14, Ill.
Burnok thixotripic alkyds, conventional alkyd vehicles, PVA copolymers, epoxy esters, varnishes, calciocoaters, tinting alkyds, poly-electrolyte resins, grinding japans, hammer finish vehicles
Balfour Bennett LuBien C. Smith
L. Smith Tinker Winkler

WEBSTER EQUIPMENT CO., INC. 503
Chicago 6, Ill.
Automatic small batch filling and capping machine, standard automatic paint filling, cover dropper and capping machine
Webster Golbin G. Stevens A. Stevens
Jensen

C. K. WILLIAMS & CO. 411
E. St. Louis, Ill.
Red, yellow, brown and black iron oxide pigments; green chromium pigments; fine ground umbers, siennas and natural red oxides
Thomasen Crumpler Hockersmith McCarty
Phillips Alexander Burris Green
Lippincott Hathaway Richards Dubbeldeman
Jeffrey Wells Fuller Kroepel
Nielson
— **See Advertisement Page 39** —

WITCO CHEMICAL CO. 434-35
New York 17, N. Y.
Driers, plasticizers, carbon blacks, surface active agents, stearates and "Witcarb" extender pigments, phthalic anhydride, emulsion driers and zinc stearate
Armato Kaszynski Graves McKinsey
Marone Shaw Vaccaro Sucher
Harrison Minnig Wishnick Gardner
Spielman
— **See Advertisement Page 136** —

NPVLA and FEDERATION HIGHLIGHTS

McClellan, Cherne Talks Feature 73rd Meeting

H. C. (Chad) McClellan, former Assistant Secretary of Commerce, and Leo Cherne, Executive Director of the Research Institute of America, will be the featured speakers at the 73rd Annual Meeting of the National Paint, Varnish and Lacquer Assn. at the Drake Hotel, Chicago, October 27-28-29.

Mr. McClellan will present *Moscow Report* at the opening session, Thursday afternoon, October 27. A Los Angeles paint manufacturer

Harold C. McClellan

who formerly headed the National Assn. of Manufacturers, Mr. McClellan is an authority on his subject.

Having served as Assistant Secretary of Commerce for International Affairs and visited 35 countries on special missions for the State Dept., he has a particular insight into world conditions. He was selected by President Eisenhower to be General Manager for the American National Exhibition in Moscow. He will give his views on the means by which we can best conduct relations with the Russians during this decade.

Leo Cherne

On Saturday morning, October 29, Leo Cherne will again give one of his forceful, dynamic talks. He will discuss *The Donkey—The Elephant—And Your Future.* He will tell how the economic future of business men will be affected by the Federal Government's policy during the next four years.

Leo Cherne will outline what, in his opinion, the future holds in store for business under either party. The problem of taxes, government control, expansion of foreign trade, inflation, the strengthening of our economy, all affect future planning.

A most interesting conference is scheduled for Friday, October 28 at the Annual Meeting. It will be devoted to the important subject of *Technical Manpower—How to Get It, How to Keep It* and presentations will be made on technical personnel employment and techniques used by manufacturers in the industry.

The conference will begin at 10:00 A.M., recess for lunch and continue into the afternoon.

J. A. Hager, Chairman of the Chemical Coatings Annual Meeting Program Committee will preside. Manufacturers of all sizes will present their experiences regarding technical manpower.

H. J. Mather will present the large manufacturers' experience, Arthur Slocum for the medium size manufacturers' and C. A. Brethen, Jr., will speak on the small manufacturers' experience. Earl C. Kubicek Placement Director for Illinois Institute of Technology will give the universities' viewpoint.

The conference is open to all

Joseph A. Hager

members of the Assn., including Class A and B members. Raw material suppliers have technical manpower problems similar to those of the manufacturers of finished products.

After the presentations are made there will be discussions from the floor and members may ask specific questions of the panel.

This conference on technical manpower is the first phase of a series planned to determine what lies ahead in the 60's for chemical coating manufacturers and is designed to assist these manufacturers and their suppliers to better

Paul B. Cefalu

prepare for the changing economic conditions ahead.

The Technical Manpower Conference will take place in the French Room of the Drake Hotel and all association members are urged to participate.

The Annual Roof Coatings and Roof Cement Manufacturers' Forum, under the direction of Paul B. Cefalu, Chairman of the Roof Coatings Steering Committee, will headline two prominent speakers and a comprehensive question and answer session.

Dr. Thomas Mastin, Lubriszol Corporation, will address this Forum on the subject, *Asphalt Additives*. This subject will be of particular interest to members because of the growing importance of asphalt products in the roof coatings industry.

Mr. Fred Yenkin, Yenkin-Majestic Company, will present *A New Development in Colored Aluminum Roof Coatings*. Members will be brought up to date on the usage of a special alkyd used in the manufacture of these colored roof coatings.

Naval Stores Breakfast Scheduled for October 28

The 1960 Naval Stores breakfast will be held on Friday, October 28, at 8:30 A.M. at the Drake Hotel.

This traditional meeting is part of the Paint, Varnish and Lacquer Assn. Convention and is being sponsored by the Chicago Club. This will give members of the industry an opporutnity to renew their acquaintance and exchange views especially during this critical period.

Payne, Fogle, Talks Feature 38th Meeting

HENRY F. Payne, Professor in Charge of Organic Coating Research and Technology at the University of Florida, Gainesville, Fla., has been selected to present the Annual Joseph J. Mattiello Memorial Lecture at the 38th Annual Meeting of the Federation of Societies for Paint Technology which will be held at the Hotel Sherman in Chicago, Ill. from October 31 through November 2.

The subject of his lecture will be *The Philosophy of Coatings*.

Henry F. Payne

The Mattiello Lecture, instituted by the Federation in 1949, commemorates the name of Dr. Joseph J. Mattiello, who, as a member of the Federation, did so much to expand the application of the science in the protective coatings field. Professor Payne is the twelfth outstanding scientist to receive one of the paint industry's highest honors—selection as a Mattiello Lecturer. Previous Lecturers were: Roy H. Kienle (1949); Theodore F. Bradley (1950); Donald H. Wheeler (1951); John R. MacGregor (1952); Adolf C. Elm (1953); James S. Long (1954); Herman F. Mark (1955); Maurice Van Loo (1956); Albert C. Zettlemoyer (1957); Eugene G. Rochow (1958); and Vincent C. Vesce (1959).

Professor Payne has had a wide range of experience in the paint industry and has been associated with the University of Florida for the past five years.

Keynote Address

The Federation of Societies for Paint Technology has announced that E. Edgar Fogle, President of Union Carbide Chemicals Co. will present the Keynote Address. Mr. Fogle has been scheduled to speak at the Monday morning session, October 31.

Mr. Fogle has been President of Union Carbide Chemicals Co. since 1957, following almost 30 years with the company in various aspects of chemical marketing and administration. During his tenure of leadership, the company has strengthened its position in the synthetic organic chemicals field through a balanced growth program of basic research, applications research, production, and customer service.

He became associated with Union Carbide in 1930 as a research fellow for the company at Mellon Institute. However, he has spent most of his time with the company in chemical marketing. For seven months in 1953, he was on leave-of-absence to serve as Director of the Rubber, Chemical, Drugs, and Fuels Division of the Office of Price Stabilization in Washington, D. C.

During his years in the field sales organization, Mr. Fogle has been a Technical Representative in New

E. Edgar Fogle

York City, the southeastern states, and Albany, N. Y. He was Manager of the Cleveland and Chicago districts for the company, and from

1944 to 1947 he was Western Division Sales Manager.

Mr. Fogle was appointed Assistant Sales Manager for Union Carbide Chemicals in 1947, at which time he moved to the company's headquarters in New York City. In 1954, he was made a Vice-President and in 1957 he was appointed President.

Rheology

E. J. Dunn, Jr., Program Chairman of the Annual Meeting, has announced the membership of a panel on Rheology. Dr. Walter K. Asbeck of Union Carbide Chemicals Co. will be moderator of the panel. The other two panel members will be D. W. Brookfield of the Brookfield Engineering Laboratories, and R. L. Whitney of the National Lead Company.

The more recent work on the theoretical aspects of the viscosity of dispersed systems will be discussed in the light of practical paint technology by Dr. Asbeck. The fundamental relationships leading to good brushing and leveling of pigment dispersions will be elucidated. Suggestions will be made as to how these basic concepts can be most readily used to the advantage of the paint chemist.

The *Measurement of Rheological Properties* will be discussed by Mr. Brookfield in terms of the ideal

Walter K. Asbeck

and in practical terms covering the various approaches and methods currently incorporated in commercially available equipment.

This will include a discussion of the advantages and disadvantages of each from the point of view of the "paint rheologist" and his requirements for evaluation techniques for both viscous flow and gel properties.

Mr. Whitney will discuss Rheology from the practical paint maker's view point. Brushing or application properties, sagging, levelling and settling are all properties affected by the rheological characteristics of the coating. Viscosity and thixotropy will be discussed in relation to the above properties.

J. W. Tomecko

Maintenance Painting

The Federation has planned a panel meeting on Metal Protective Maintenance Painting as one of the features of the Annual Meeting. J. W. Tomecko of Canadian Industries, Ltd., Montreal, will be moderator of the panel. Other panel members are F. W. Shanks, Chief of the Chemical Paint Section of the U. S. Army Corps of Engineers, Rock Island; R. P. Devoluy, Marine Manager of the Glidden Company, New York City; and S. C. Frye of the Bethlehem Steel Company.

The difficulties normally encountered in ship painting will be discussed by Mr. Devoluy as well as the limitations on choice of type of paint imposed by these difficulties. Paint performance from the shipowner's viewpoint is mentioned and some suggestions offered on how to obtain more reliable results from marine paint tests.

W. C. McCrone

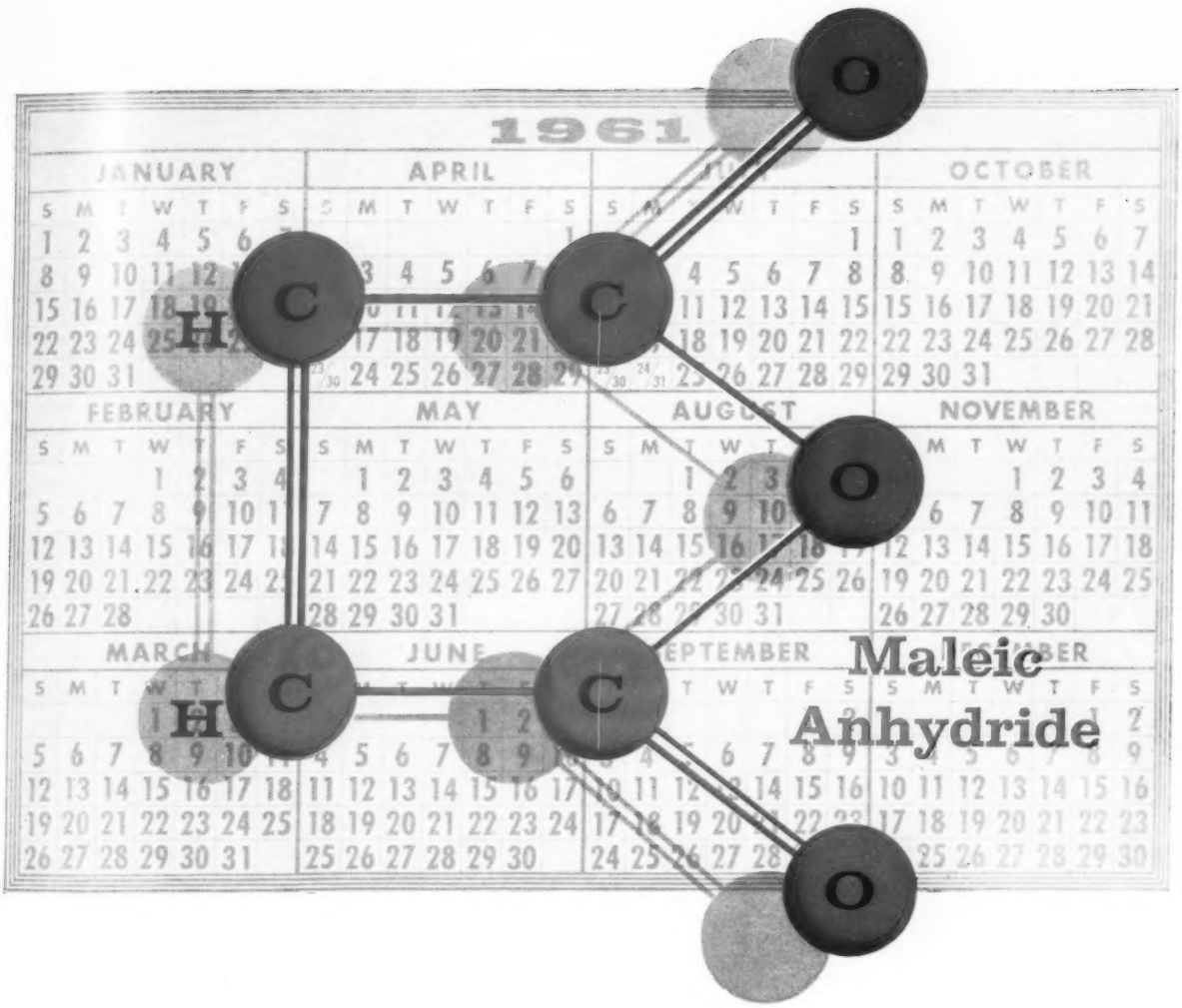
The discussion by Mr. Frye will cover the methods used to survey plant corrosion problems to determine where maintenance painting is necessary. The discussion will also include the types of products necessary for use in different environments, and the types of coatings and methods of applications required for initial and subsequent product protection.

Instrumentation

Another of the program highlights of the Federation Show will be a panel discussion on Instrumentation in the Paint Industry. The moderator of the panel will be Dr. W. C. McCrone of Walter C. McCrone Assoc., Chicago. The other two panel members will be Dr. H. A. Liebhafsky of General Electric Co. and Nathaniel Brenner of the Perkin-Elmer Co.

After the properties of x-rays that make them valuable in chemical analysis and control have been described, four ways in which they can be used for these purposes will be illustrated by Mr. Liebhafsky with examples of interest to the paint industry.

A summary of applications of infrared spectroscopy and gas chromatography to paint research and control methods will be given by Mr. Brenner. The use of pyrolysis product analysis for the characterization of polymers will be illustrated. The applications of infrared spectroscopy to the characterization of solvents and resins will also be reviewed.



Best way to solve your 1961 MALEIC problems:

Call Pittsburgh Chemical now!

Right *now* is the time to make sure you have dependable supplies of uniform-purity maleic anhydride in 1961. And the best way to do that is to call *Pittsburgh Chemical* today.

To keep pace with the constantly growing demand for Pittsburgh maleic anhydride, our new twenty million pounds/year maleic plant will go into production early in 1961. This modern, fully-integrated plant will permit complete quality control—from coal to finish maleic.

The advantages to *you*?

(1) A uniform, virtually dust-free product that will help you maintain maximum ease-of-handling and efficient, trouble-free processing.

(2) Assurance of reliable, on-schedule deliveries from a *basic* source.

(3) Available in cost-saving mixed carload lots with Pittsburgh fumaric acid and/or phthalic anhydride.

(4) Backed by alert, responsive technical service, in your plant when necessary.

Pittsburgh Chemical does *not* make resins . . . only the high-purity intermediates used to produce them. So for reliable supplies of maleic anhydride, next week or next year, call your nearest Pittsburgh Chemical regional sales office *today*.

INDUSTRIAL CHEMICALS DIVISION

PITTSBURGH CHEMICAL CO.

GRANT BUILDING PITTSBURGH 19, PA.

A Subsidiary of PITTSBURGH COKE & CHEMICAL CO.

2465

Regional Sales Offices: Pittsburgh • New York • Nashville • Chicago • Houston • Los Angeles • San Francisco

Photographed with the cooperation of Bassett Furniture Industries, Inc.

In white pigmentation, TITANOX® provides the imagination

Imagination, the force that changed the look of America's furniture, also sparked the development of TITANOX, the white titanium dioxide pigments so suitable for today's white and light-colored furniture finishes.

Take TITANOX-RA-50, the multi-purpose, rutile titanium dioxide pigment that meets the twin requirements of modern finishes—end-product quality and production efficiency. This easy dispersing pigment provides high brightness, whiteness and hiding power at low pigmentation . . . retards after-yellowing and chalking. And above all, its uniformity of all properties makes it a favorite with paint production men.

For every special requirement, there's a TITANOX pigment to provide the solution. For furniture used exclusively indoors, TITANOX-RA, for instance, may be preferred. When higher total pigmentation is needed, as in primers, the TITANOX titanium-calcium pigments —TITANOX-RCHT (30% TiO_2) and TITANOX-C-50 (50% TiO_2) provide the necessary hiding power and contribute to the specialized film properties needed in base coats on wood. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

TITANIUM PIGMENT CORPORATION
SUBSIDIARY OF NATIONAL LEAD COMPANY

7810-A

By
Edward Anthony

The author expresses his random reflections on various aspects of the paint industry. The opinions contained in this column are his alone and do not necessarily reflect those of this publication.

Bigness

THE mere physical size of a person, or an organization, is a poor criterion for sociological worth, though hugeness is often mistaken as the proper guide for community contribution. In the business world the size of a company is, likewise, an improper standard for the excellence of its management, the soundness of its fiscal policies, and its contribution to the economy. Two decades ago the Temporary National Economic Committee of Congress conducted a series of exhaustive investigations into the merits of corporate bigness. At that time it was concluded that more often than not their smaller brothers produced more profits (by any of the numerous yardsticks employed), could more rapidly move to meet the ever-changing competitive conditions of a free market, and in general operated more efficiently, planned better, and grew more rapidly.

However, since our largest corporations are almost invariably listed on the Big Board, and therefore must publish extensive financial information, close analysis of their operations can be made for comparative purposes.

All of this is by way of introduction to *Fortune Magazine's* sixth directory of the five hundred largest United States industrial corporations (July 1960 issue). Though composed of almost a score of pages of tables of information, a perusal of the list of these elite companies is a fascinating parade of many of the best known corporate names, as well as a surprisingly large number of unfamiliar, little publicized, organizations.

Of this group, I counted ten companies who produce organic coatings as a considerable portion of their total sales: duPont (12th ranking industrial by '59 sales), Pittsburgh Plate Glass (72nd), National Lead (82nd), Merritt-Chapman and Scott (105th), American-Marietta (137th), Sherwin-Williams (174th), Glidden (230th), Interchemical (329th), Stanley Works (373rd), and W. P. Fuller (466th).

Obviously the majority of the sales of most of these companies is generated by producing items other than paint and allied products. Yet they are the only direct guides we have for our industry. of the numerous columns in the tabular rundown, the last two items are of particular interest: the profit as per cent of sales varies from duPont's second ranking 19.8% down to Fuller's 1.4%; and the profit as per cent of invested capital ranges from P.P.G.'s 17.4% to Fuller's 3.2%.

Of additional interest is the relative level of the chemical industry compared with the other fifteen types of end products represented in the 500. The following listing puts into perspective the productive category toward which the paint industry contributes approximately $2 billion in sales (about seven per cent of the chemicals total):

. . .sales per invested dollar range from 58c to $16.52, average $2.06, chemicals (11th) $1.64;

. . .sales per employee range from $5,223 to $218,181, average $20,-054, chemicals (fifth) $24,298;

. . .assets per employee are at a low of $3,969, a high of $105,952, average $14,849, chemicals (4th) $21,688;

. . .return on sales shows chemicals fourth at 8% profit, compared with an all-industry average of 4.9%;

. . .return on invested capital places chemicals second with 12.7% versus industry's average of 10.3%.

Such information can render valuable comparative figures for the individual, smaller enterprises of our industry.

Going through the list of these 500 giants reveals at least 100 companies whose products employ organic coatings as integral sales features — ranging from Number One, General Motors, to Number 500, Masonite, and includes manufacturers of appliances, automobiles, furniture, tin cans, computing machines, aircraft, *et al, ad infinitum.* Of course, virtually every one of the half a thousand uses paint for maintenance and (identification) purposes.

At least 80 of these companies supply the resins, pigments and solvents to the paint industry, as well as the basic chemical building blocks of these components.

Dry statistics? No; they figuratively come to life when you look at them through the eyes of your own interests!

The Language Curtain

IF you think "the Greeks had a word for it," consider the present state of our vocabularies. The plural was purposely used for the last word of the previous sentence to emphasize the disparity between the layman's ordinary range of word recognition and

usage, and the jargon employed by the sophisticate versed in a particular specialty. For example, the ill-fated U-2 airplane incident: this was no ordinary mission, but is termed an "overflight". What else is a flight if it is not *over* something? Redundancy? Perhaps; but also merely the language of the initiate in this specific matter.

The Minneapolis-Honeywell Regulator Co. has just printed a helpful and interesting booklet explaining their "Computerese" type of conversation, so obviously necessary to the successful specialist in this field. This glossary was preceded by an M-H "Automation Dictionary," so we go from *transfer function* and *transient state* to *digital*, *transducer* and *floating point arithmetic*!

To simple souls—parents, and what-have-you—listening to the spouting of these words from the mouths of their babes—is a frightening, but challenging, experience. Oh, true, we in the finishes game do have some jargon we can call our own; but, 'fess up, how many times today did you find it compelling to mention *solvent cook*, *film weight*, or even *ambient temperature*? In self defense (and for prestige purposes) a large but exclusive group of verbiage should be developed at the next annual meeting of the Federation, and disseminated with the assistance of appropriate budgetary appropriations!

Additives and Finishes

THE words, "Section 409, Food, Drug and Cosmetic Act" seem innocent enough, but they stand for an important and far-reaching method of federal control over so-called "food additives". From a practical point of view of the new law outlaws any substances which may be harmful to health, considering the amount which is purposely added to or migrates into a food product. How does this affect the coatings industry? In a broad sense we supply innumerable products which come into contact with food in its various forms—can linings, paper coatings, adhesives, printing inks, plastic film coatings, etc.

These items, supplied by many companies in our industry, *could* contain extractable ingredients which *could* be toxic when in contact with the various components of the particular food stuff they touch. If extractables are produced, the organic coating they come from would become subject to this new law. Thus, resins, pigments, driers, release agents, lubricants, and any other portion of the finish formula could, as a corollary to its use, bring a composition under the law. However, each use must be considered separately: a coating used to contain a fatty meat product could behave quite differently when used to package a highly acid fruit.

And if extractable ingredients are produced, what then? A number of "white lists" have been published (in the Federal Register) which have the effect of clearing the listed items for use in food and food packages. This is based on general recognition by qualified experts of the safety of the substance for its intended use—either by scientific procedures or, in the case of use prior to 1958, by experience based on common use. Of course, new information could subsequently strike out a particular additive.

Prior sanction of substances by the F.D.A., or approval by the Department of Agriculture, or specific tolerances of an item that have been set up by F.D.A. action, allow a product to be used. New products must be considered by their specific use and may not

be used until approved by the F.D.A. Numerous detailed resumes of this law and its affect on various industries have appeared in the past six months. A typically good report is that in *Chemical Week*, July 9, 1960.

What do some of these terms we have been discussing mean? The National Academy of Sciences-National Research Council has published an inclusively titled booklet, "Principles and Procedures for Evaluating the Safety of Food Additives" (Publication 750, December 1959), which includes some appropriate definitions. For example. "a *food additive* is a substance or a mixture of substances, other than a basic food stuff, which is present in food as a result of any aspect of production, processing, storage, or packaging. . . ." "*Toxicity* is the capacity of a substance to produce injury." "*Safety* is the practical certainty that injury will not result from use of a substance in a proposed quantity and manner." "*Hazard* is the probability that injury will result from use of a substance in a proposed quantity and manner."

This publication includes general "principles as a guide to policy decisions for use of additives," sets up a basis of evaluation (through anticipated amounts and patterns of consumption, chemical and physical properties of the additive, and biologic effects), suggests the scope of investigation, and proposes a guide for evaluation of the results and reaching a decision.

Dollars and Nonsense

AT the May 1960 meeting of the Appliance Technical Conference of the American Institute of Electrical Engineers, estimates of the cost of servicing appliances ranged from four to five *billion* dollars a year—$70 to $90 per household—about one per cent of the Gross National Product!

•

Spans Two Continents In New Agreement

H. Kohnstamm & Co., Inc., N. Y., a leading producer of certified food colors and pigments for industry, has entered into a joint agreement with Horace Cory and Co., Ltd. of London. The British firm founded in 1828 is one of the largest pigment producers in Great Britain.

In announcing the agreement, which became effective August 1, Louis J. Woolf, Chairman of the Board of Kohnstamm, said, "We consider ourselves fortunate to be associated with such a highly respected, progressive and growing concern as Cory and Co., Ltd." Adding that immediate expansion is planned, Mr. Woolf, who it is expected will serve on the Cory Board of Directors, said, "A new plant will be constructed on the outskirts of London. This new facility will be equipped with the most modern production facilities and will eventually replace the present Cory plant."

Under the terms of the agreement, H. Kohnstamm & Company Inc., one of the oldest privately owned chemical companies in America, will have a major interest in Horace Cory and Co., Ltd., (whose shares are traded on the London Stock Exchange). Features of the agreement provide for Kohnstamm dyestuffs and pigment colors to be manufactured by the Cory Company for sale throughout the Commonwealth and the "outer-seven" trading areas as well as other specified countries of the world. The products will be manufactured under the Kohnstamm label and under Kohnstamm's formulations and supervision.

They're both guns, but...

each is in a class by itself . . . like Wyandotte's PURECAL® O

A little bit of water won't do you any harm. But a little bit of lead? That's different! Still, there's no gun you can afford *not* to take seriously.

It's the same way with calcium carbonates. There are important differences . . . and it pays to give them careful consideration. Wyandotte PURECAL O is in a class by itself! Reason: It is precipitated by a special process which consistently yields agglomerate-free particles 0.15 micron in size, that are cubical in shape. Purity and whiteness are *exceptional.*

PURECAL O is a quality builder . . . it acts as a suspending agent for the other pigments, maintains dispersion and increases shelf-life. PURECAL lowers prime pigment requirements for a specified level of quality or can improve quality with a given level of prime pigments used.

The result: PURECAL O can improve the quality of your product at no increase in cost . . . or maintain quality while cutting costs. Try it in *your* process. Write for samples and data, today. *Wyandotte Chemicals Corporation, Dept. 759-P, Wyandotte, Michigan. Offices in principal cities.*

Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

PACING PROGRESS WITH CREATIVE CHEMISTRY

EXPOSURE RESULTS

(From page 78)

example, blistering of conventional house paints under adverse moisture conditions will not be eliminated by applying a fresh coat of an "Elvacet" base paint. Loss of adhesion between the substrate and the old paint film will still occur even though there is excellent bonding between the old paint and the "Elvacet" base paint. An illustration of this type of paint failure is shown in Figure 5. When the old paint is blistered, peeled, cracked, or flaked it should be removed by scraping, burning, or with a paint remover, and the surface then finished as new wood, i.e., a blister-resistant primer followed with a topcoat of a 30%-35% PVC paint based on "Elvacet" 1423 polyvinyl acetate copolymer emulsion.

Figure 5. Blistering of ordinary linseed oil paint, caused by adverse moisture conditions, will not be eliminated by applying a fresh topcoat of an "Elvacet" base paint. The old paint must be removed before painting.

Tests have been carried out on a house constructed of wood clapboard from which several layers of old linseed oil paint had been removed by burning and then sanding. An adverse moisture condition in this house had caused blistering and peeling of the old paint. Excellent results have been obtained on this house with blister-resistant linseed oil and alkyd primers topcoated with "Elvacet" 1423 polyvinyl acetate copolymer emulsion base paint. To obtain further information on performance of PVA paints over burned-off wood, additional tests are being made under these conditions.

(Continued on following page)

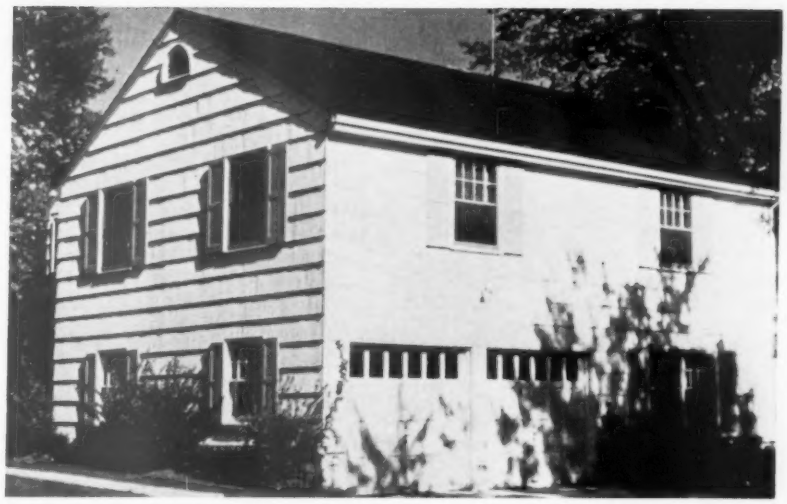


Figure 6. Results have been excellent with "Elvacet" base paints applied to weathered cedar shakes. On new cedar shakes and shingles, application of a blister-resistant alkyd or linseed oil primer is suggested to prevent staining.

Cedar Shakes and Shingles

The problem of cedar staining has long plagued the industry. Red cedar contains water-soluble components which leach to the surface, leaving an unsightly deposit which takes time to erode or to be insolubilized. Our results indicate that staining of new cedar can best be overcome by priming with a blister-resistant linseed oil or alkyd primer. An aqueous solution of lead acetate is also sometimes effective but its extreme toxicity militates against its use except in unusually well controlled applications.

The Electrochemicals Department has a number of test houses where "Elvacet" base paints similar to formulations E-1056, E-1057, E-188 and E-189 in a variety of colors were used to repaint badly stained cedar shakes and shingles. Results to date have been excellent with the "Elvacet" base paints applied to weathered shingles. Little or no evidence of additional staining has occurred. These paints merit serious consideration for meeting the demand of this market for an easily applied, quick-drying, durable, low-cost paint.

SUGGESTED PAINTING SYSTEMS

Based on extensive research and exposure tests of "Elvacet" base paints, the following painting systems are suggested for best results on exterior wood surfaces.

1. On new or burned-off wood, a blister-resistant linseed oil or alkyd primer followed by two coats of a 30%-35% PVC paint based on "Elvacet" 1423 polyvinyl acetate copolymer emulsion.
2. Over previously painted wood, "Elvacet" base paint system as determined by substrate condition:

Substrate Condition	Treatment
Good adhesion of old paint, no chalking.	Two coats of 30%-35% PVC paint based on "Elvacet" 1423.
Good adhesion of old paint, chalky surface.	First coat, "Elvacet" base paint reduced with tung oil or alkyd; topcoat, a 30%-35% PVC paint based on "Elvacet" 1423.
Poor adhesion of old paint, blisters, cracks, etc.	Remove loose paint, blisters, etc.; first coat, an oil primer; topcoat, a 30%-35% PVC paint based on "Elvacet" 1423.

Sources of Supply of Materials* Used in Formulas E-188, E-189, E-1056 and E-1057

"Daxad" 30 dispersing agent	Dewey and Almy Chem. Div.
"Tamol" 731 dispersing agent	Rohm & Haas Company
Dibutyl phthalate	Monsanto Chemical Company; Eastman Chem. Products, Inc.
Mica, 325 mesh, waterground	English Mica Company
"Nytal" 300 talc	R. T. Vanderbilt Company
"Ti-Pure" R-610 titanium dioxide	E. I. du Pont de Nemours & Co. Pigments Department
"Ti-Pure" FF titanium dioxide	E. I. du Pont de Nemours & Co. Pigments Department
"Cellosize" WP-4400 hydroxyethyl cellulose	Union Carbide Chemicals Co.
"Methocel" 4000 methyl cellulose	Dow Chemical Company
Propylene glycol monococate C	Colgate-Palmolive Company
"Emulphor" EL-719 dispersing and wetting agents	Antara Chemicals
"Witco" 912 wetting agent	Witco Chemical Company
"Carbitol" diethylene glycol monoethyl ether	Union Carbide Chemicals Co.
"Polyglycol" P-1200 polypropylene glycol	Dow Chemical Company
"Elvacet" 1423 polyvinyl acetate copolymer emulsion	E. I. du Pont de Nemours & Co. Electrochemicals Department
"Elvacet" 81-900 polyvinyl acetate emulsion	E. I. du Pont de Nemours & Co. Electrochemicals Department
"Igepal" CA-630 wetting agent	Antara Chemicals
"Bufen" 30 phenyl mercury acetate solution	Buckman Laboratories, Inc.
"Nildew" AC phenyl mercury acetate	Naftone, Inc.

*Specification of proprietary products does not imply an unqualified recommendation by the du Pont Company; there are undoubtedly others of similar type which may be equally or better suited for the purpose.

Summary

Comprehensive exposure testing programs have been carried out with "Elvacet" polyvinyl acetate emulsion base paints on wood. Based on the results of these exposures, painting systems for wood have been developed. Further work is underway to develop water thinned primers for new wood.

A bright future exists for exterior polyvinyl acetate emulsion wood paints since it is estimated that this market will grow from approximately 2,000,000 gallons in 1960 to 25,000,000 million gallons in 1965.

•

Adds 20 Million Pounds of Maleic Anhydride

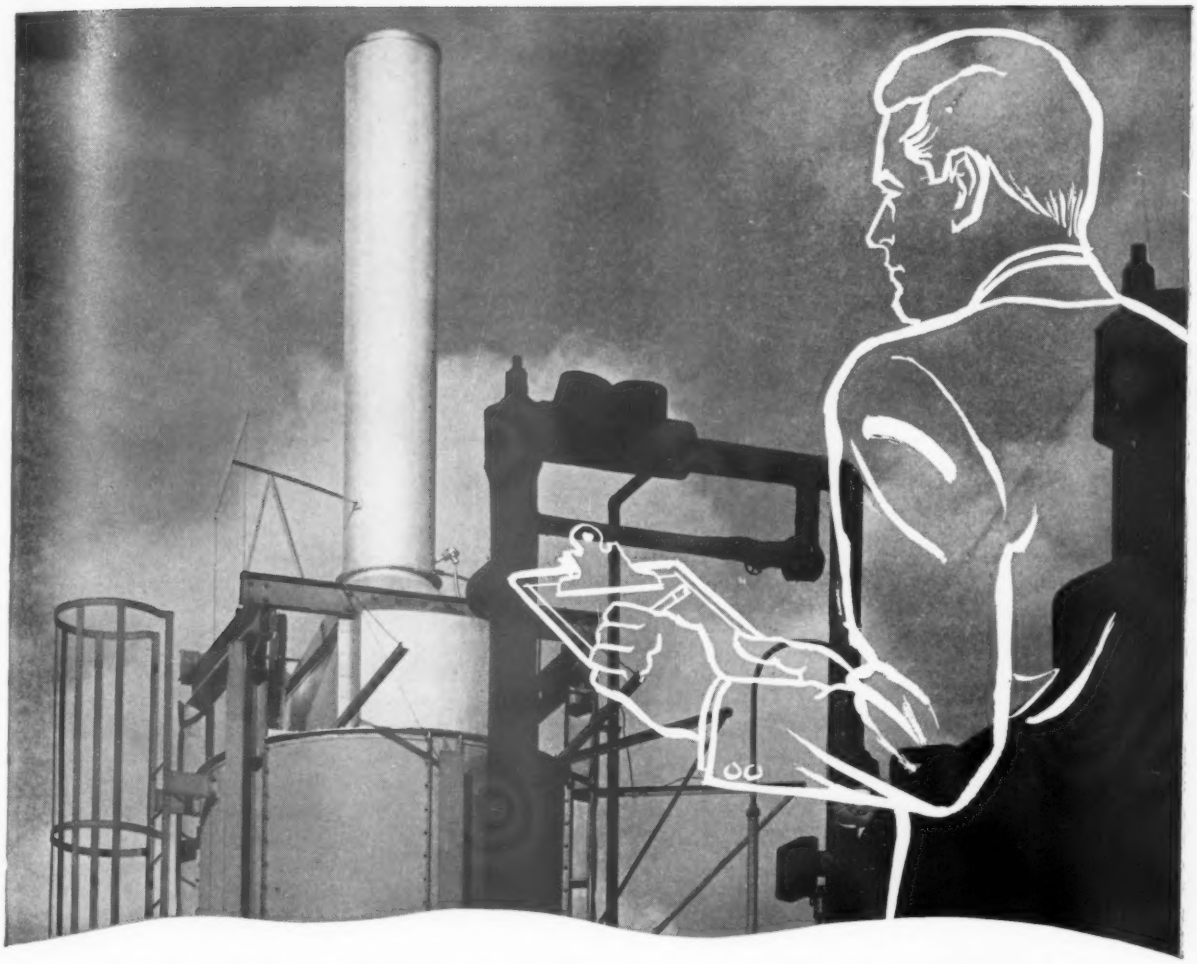
Monsanto Chemical Co. has strengthened its position as one of the world's largest producers of maleic anhydride with an additional 20 million pounds of production capacity now on stream for the versatile resin material.

With the expansion, the company reports that it has increased its potential output 50 per cent to a total of 60 million pounds per year.

The firm estimates that current production of maleic anhydride in the U. S. is at a rate of 85 million pounds for the year. This indicates an increase of 63 per cent over the 52 million pounds produced in 1958.

Polyester resins for reinforced plastics account for approximately 30 per cent of current maleic anhydride consumption, the firm says. Their market has grown at an annual rate of 15 per cent in recent years, reflecting a surging demand for reinforced plastic boats, trailer and truck bodies and materials for the construction industry.

Alkyd and vinyl-based surface coatings account for another 30 per cent of the resin material's market, and are another area of strong, continuing growth.



HOW THE SILICONES MAN HELPED... CUT COSTS OF HOT STACK PROTECTION

HEAT RESISTANT to 1200 deg. F., a low-cost, high-temperature silicone-aluminum paint using UNION CARBIDE R-64 Silicone has protected this exhaust stack for six months. And the stack is still like new.

This despite the fact that the stack—on a gas-fired, high-temperature fluid heater—has operated continuously at 1000 deg. F., with intermittent exposure to corrosive (HCl) atmosphere.

Formulated by a specialty paint manufacturer, the paint is based on R-64 silicone resin and aluminum pigment. The resin, recently introduced by the UNION CARBIDE Silicones Man, is especially designed for cold blending with alkyd, melamine, and acrylic type baking enamels to give them improved color and gloss retention, thermal stability, and resistance to weathering. Aluminum-pigmented R-64-alkyd blends have all the high-temperature properties of straight silicone-aluminum paints—with important cost savings.

For performance data and proven formulae, write to your Silicones Man or Dept. JQ-6001, Silicones Division, Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada:* Bakelite Company, Division of Union Carbide Canada Limited, Toronto 12.

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UNION CARBIDE SILICONES

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Furthermore, Witco offers the broadest stearate line available which includes grades and types designed to perform efficiently with virtually every formulation....impart exactly the right degree of flatting and pigment suspension.

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ACRYLIC EMULSION PAINTS FOR WOOD

(*From page 83*)

Table I

Suggested Exterior Test Formulations with Rhoplex AC-33 for Wood Surfaces

Material Pounds per 100 Gallons	30% P.V.C. Topcoat for Wood	35% P.V.C. Topcoat for Masonry and Wood
Add in order shown and mix thoroughly in a change can mixer:		
Water	—	42.0
Methyl cellulose (2% solution — 4000 cps)	41.0	75.0
Rhoplex AC-33 (46%)	35.0	—
Triton CF-10	3.0	2.0
Tamol 731 (25%)	15.0	7.8
Antifoamer	2.0	2.0
Non-chalking rutile titanium dioxide	175.0	175.0
Chalking anatase titanium dioxide	75.0	75.0
Calcium carbonate	133.5	185.0
Add and mix thoroughly:		
Rhoplex AC-33 (46%)	94.0	—
Put above paste through high-speed stone mill and add:		
Rhoplex AC-33 (46%)	531.0	569.0
Ethylene glycol	30.0	25.0
Preservative	9.0	9.0
Antifoamer	2.0	2.0
Ammonium hydroxide (28%)	1.0	1.5
Total	1146.5	1170.3
pH	9.1	9.1
Viscosity (Kreb Units)	77	76
Solids	60%	60%

In the warm, dry climate of the southwestern states, many paints are formulated with straight rutile non-chalking titanium dioxide. In this climate, dirt collection is at a minimum and low chalking rates are adequate.

For more northerly climates, where heavy rainfall is encountered and atmospheres may be more contaminated, anatase chalking type titanium dioxide is commonly used as a portion of the pigment. Our tests indicate that the 15% to 20% of chalking type anatase type pigment with the balance non-chalking rutile will normally give very good results in these climates.

For colored paints it is essential that straight rutile type non-chalking titanium dioxide be used. The total amount of titanium dioxide in tinted paints should be kept to a minimum so as to reduce chalking tendencies to the lowest possible value.

Exterior Test Formulations

Two typical test formulations for acrylic emulsion paints are given in Table I. These are at 30% pigment volume content and at 35% pigment volume content respectively and are suitable for test work by paint manufacturers who are interested in studying the durability characteristics of acrylic paints on wood surfaces. However, it is essential that a paint manu-

Table II

Outline Formulations for 1953 Exposure Series*
Exterior Paints Made With Rhoplex AC-33

Material	Formulation Numbers										
	6	7	10	13	14	15	17	18	21	22	23
Titanium dioxide (Free-chalking anatase)	—	—	100.0	—	94.3	97.3	—	112.5	—	—	87.5
Titanium dioxide (Non-chalking rutile)	200.0	200.0	100.0	165.0	94.3	97.3	220.0	112.5	210.0	182.0	87.5
Talc	93.2	189.5	185.5	197.0	—	—	—	251.5	—	—	—
Water-ground mica	—	—	—	—	174.0	—	—	—	307.0	—	—
Diatomaceous silica	—	—	—	—	—	162.0	—	—	—	235.0	—
Calcium carbonate	—	—	—	—	—	—	293.5	—	—	—	359.0
Rhoplex AC-33 (46%)	761.0	631.9	634.2	559.0	600.0	623.0	574.0	513.0	377.0	345.0	415.0
Pigment volume content (%)	20	30	30	30	30	30	40	40	50	50	50
Total solids (%)	57.7	60.0	60.0	57.4	56.2	58.8	63.9	60.4	60.3	52.0	56.7

*All of these paints contained approximately the following amounts of materials in addition to those shown:

	Pounds
Tributyl phosphate	9
Pine oil	3
Anti-foamer	2
Boric acid	7
Dispersant solution	11-20
Preservative	6
Ammonium hydroxide	20

Table III

Seven Year Ratings on 1953 Exposure Series
South vertical exposure — Pennsylvania area. Two coats on Southern yellow pine.

Paint Number	Dirt Retention	Chalking 18 Months	Chalking 33 Months	Chalking 7 Years	Grain Cracking	Flaking	Erosion	Mildew
6	5.0	9.5	9.0	8.3	6.0	9.7	10.0	8.0
7	7.0	10.0	9.3	6.3	6.0	9.3	10.0	4.7
10	8.5	9.3	2.0	4.5	7.0	10.0	7.5	9.0
13	6.0	10.0	9.5	6.5	5.0	9.5	10.0	5.0
14	9.0	7.0	4.5	3.2	7.0	8.7	9.0	8.0
15	9.0	9.0	5.5	3.3	4.5	8.5	9.0	9.3
17	5.5	10.0	9.7	9.0	5.5	9.2	10.0	4.5
18	9.0	8.5	1.0	2.0	4.5	7.0	7.5	8.0
21	6.0	9.5	9.0	7.0	4.0	5.0	10.0	9.3
22	7.0	9.5	9.3	5.0	5.5	8.0	10.0	8.0
23	8.0	9.0	6.0	5.0	6.5	9.5	9.0	7.0

facturer run careful exposure tests before offering any exterior coating on a commercial scale.

Exterior Test Results

Many exterior formulations and exposure test results have been given in the series of Progress Reports published by Rohm & Haas Company. Six of these have been issued in the last half dozen years and the seventh will be published in late 1960.

One of the earliest series of paints reported in these Progress Reports was put on exposure in 1953. Many of these paints are still on exposure. An outline of the more interesting formulations in this relatively old test series of paints is given in Table II. Exposures were south vertical in the Pennsylvania area and were on yellow pine. Two coats of acrylic paint were applied without a primer. Table III gives the outdoor exposure data on these paints after seven years of exposure.

Paints, such as number 6, 7, or 17 made with straight non-chalking rutile titanium dioxide, show the most dirt collection. Low pigment volume concentration also increased the amount of dirt collected. Chalk rates for these straight rutile paints are lower than for the paints containing free-chalking anatase titanium dioxide. The paints with anatase titanium dioxide all contained a 1:1 ratio of anatase to rutile grade and this ratio is now known to be too high for optimum results. These paints give fairly fast rates of chalking. However, despite this high ratio of free chalking pigment, ratings for erosion are moderate after seven years of exposure.

Grain cracking has occurred in all of these exposures. It should be pointed out that these panels were self primed, two coats on yellow pine, and that an oil primer should be used for optimum results on all bare wood surfaces. Paints with lower pigment volume contents in general gave less grain cracking but the differences were not large.

Flaking has occurred to some extent on all paints except #10. The low pigment volume content paints in general gave least flaking although paint #23 with 50% pigment volume had a high rating.

Erosion is now starting to take place on several of the paints which showed no erosion after 6 years. However, the rate of erosion on acrylic emulsion systems, as shown in other tests, is very low compared to oil paints.

All of the paints are showing some mildew attack after this exposure. Undoubtedly, most of the mercury preservative has been leached out of these films after this seven year exposure. The mildew ratings are approximately in inverse ratio to the chalking ratings. Another factor which affects mildew ratings is the amount of grain cracking on the panel. This permits solubles from the wood to be deposited on the surface, thus encouraging mildew growth. The data in Table III do not support this finding but other extensive exposure series on wood have confirmed this fact.

Unfortunately, none of the paints in this early series were applied over oil primers, which in recent years have been found necessary for optimum results. However, this series of seven year old exposures demonstrates very well the excellent durability properties of acrylic emulsion paints on wood.

Summary

Considerable progress has been made in the last two or three years in the application of acrylic emulsion paints to wood surfaces. Due to their excellent blister resistance, long term durability and ease of application, acrylic emulsion paints are being used in large commercial quantities for application to wood surfaces. However, it is necessary to apply an oil primer to bare wood surfaces or to heavily chalked surfaces in order to avoid cracking and peeling difficulties.

•

Gene Fowler Resigns

Gene W. Fowler, Director of Advertising and Public relations for Archer-Daniels-Midland Co. for the past 10 years, has resigned from that position effective September 1.

Mr. Fowler said he has not determined his future plans.

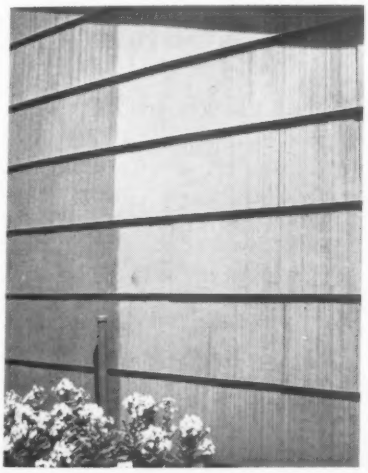
Widely known in the paint, boat, and lumber industries, Mr. Fowler has been active in nation wide promotional programs for the many industries which ADM serves. He is a member of the Paint Industry Suppliers Committee and Advertising Steering Committee of the National Paint, Varnish and Lacquer Assn. and has spoken on marketing and color trends.

During his association with ADM, the company has been honored with several advertising awards by the paint industry, including the George Baugh Heckel award and the National Industrial Advertising Association Topper award.

ALL-LATEX SYSTEM

(*From page 90*)

plied primer, topcoat and repaint systems made with Dow Latex 2647 have excellent appearance and tint retention, better than oil or alkyd systems, and equivalent to or better than competitive latex systems. Exposure histories are available to validate these statements.



Outstanding tint retention over Dow Latex 2647 systems compared to an oil paint system is shown in the above photo. Initially, both paints were the identical shade of deep maroon evidenced on the left half of the photo. In only nine months the oil paint has faded and chalked as shown on the right of the above photo.

Figure 8. Tint retention advantage of the Dow Latex 2647 system is shown above. Originally the same deep shade of green, in three years time the oil paint on the top of the photo has faded while the latex on the bottom of the photo hold its color.

These paint systems resist dirt collection during the early or non-chalking stage of weathering, enabling paint manufacturers to formulate very slowly chalking whites and non-chalking colors with exceptional tint retention. The latex topcoat has an initial low sheen appearance which is attractive to homeowners and to architects. And the fast dry of these systems eliminates in most applications any problems of bug or airblown dirt and sand collection.

Conclusion

Our early work in the design of a latex for use in exterior wood paint established the utility of the acrylic type in developing necessary paint properties while providing some margin of safecy for paint customer misuse. Dow Latex 2647 fulfills these and other property requirements.

The all-latex primer-topcoat system approach has been proved in field use and has met commercial acceptance even in regional areas where lower cost, harder-to-paint woods are employed.

•

Lee Flemming Payne Dies

Lee Fleming Payne, wife of Henry Fleming Payne, Professor of Engineering, University of Florida and this year's Mattiello lecturer, died on Sunday, August 7.

DURABILITY

(*From page 99*)

crete blocks are frequently used for construction, there is a general tendency for the differences in salt content of the blocks and mortar to cause each block to be outlined by color difference shortly after the completion of a paint job.

With the increasing use of latex paints for either primed or previously painted wood, new problems have developed. Moisture vapor permeability is a clue to certain performance characteristics noted in the finished paints.

Latex paints having higher MVT values show less blistering as the moisture vapor transmission increases. This is parallel to experience with oil type paints and like all paints latex paints can be made to resist blistering by employing pigmentations to permit the passage of water vapor. Generally accepted good practice in house painting is to employ a specially formulated primer to resist blistering and a good quality moisture barrier top-coat to protect the surface. Latex paints with either high or low moisture vapor transmission rates applied over good quality blister resistant primers show little or no blistering on panels or in practical tests. However, since high MVT adversely affects other performance properties of a paint, such as adhesion, stain, fume resistance and efflorescence, the MVT of latex paint should be held at the minimum required to yield blister resistant paint over properly prepared substrates. If we select standard good quality blister resistant primer and apply latex paints of various MVT ratings to wooden panels properly primed with this paint, we can test the resulting coating system for blistering, fume resistance, and wet adhesion quite easily. The results of a series of these tests may be seen in Table II for wet adhesion, Table III for fume and blister resistance, and Table IV for blister resistance.

Acknowledgements

1. Moisture Vapor Transmission data and special techniques for the preparation of dependable films to meet ASTM-E-96-53T-Procedure E were developed by Miss M. R. Sullivan of Monsanto Research Laboratories, Springfield, Mass.
2. Paint preparation and the development of the panel test data was done mostly by Mr. M. Silarajs of the Technical Service Laboratory at Santa Clara, California.

EXTERIOR EMULSION PAINTS FOR WOOD

(*From page 103*)

contain high molecular weight dispersed resin particles which do not penetrate a moderately heavy chalk layer sufficiently to gain adequate adhesion to the substrate underneath.

Exposures on houses and test panels indicate that exterior emulsion paints containing the normal quantity of coalescing solvents show good adhesion to lightly chalked wood surfaces and these surfaces are in very good condition after more than three years exposure

For moderate-heavy chalked wood surfaces, we believe the safest procedure is to bind the surface chalk with a satisfactory oil or alkyd primer before applying an exterior emulsion paint. Another approach is to apply a reduced coat of a long oil alkyd or other suitable exterior varnish to bind the surface chalk and then top coating with two coats of an exterior emulsion paint.

For clean, lightly chalked wood surfaces, two coats of an exterior emulsion paint usually give satisfactory performance.

Summary

1. Emulsion house paints give excellent performance on exterior wood surfaces. Emulsion-based house paints made with fine particle polyvinyl acetate copolymer emulsions have shown better appearance properties in practical exposure studies, than conventional oil paints.
2. For optimum performance, exterior emulsion house paints should not be applied to unpainted wood without useing a suitable oil or alkyd primer as a prime coat.
3. Special care has to be taken when applying exterior emulsion house paints to moderately chalky or excessively dirty surfaces to prevent possible adhesion failure.

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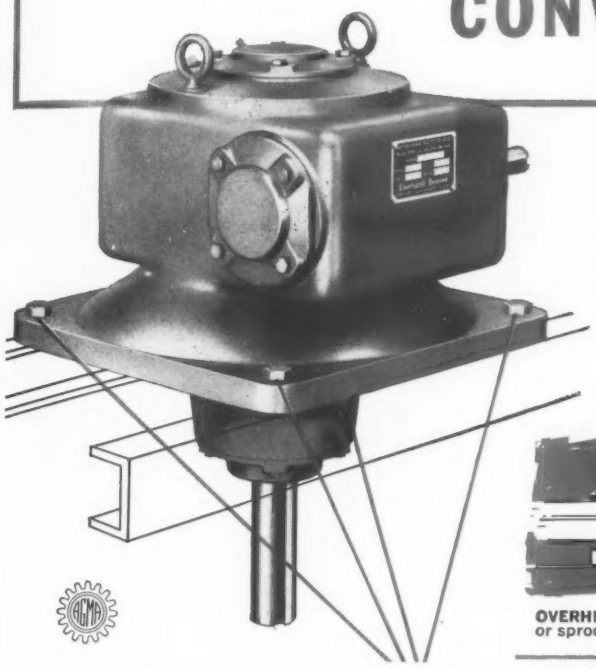

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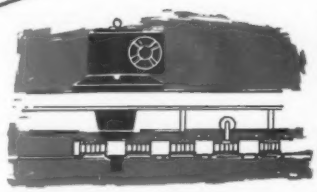
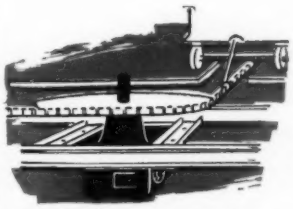
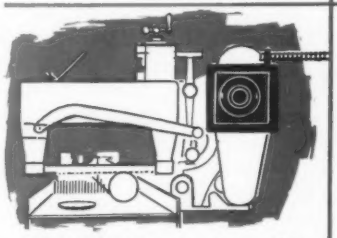


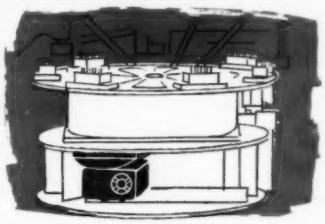
OVERHEAD . . . typical caterpillar or sprocket drives



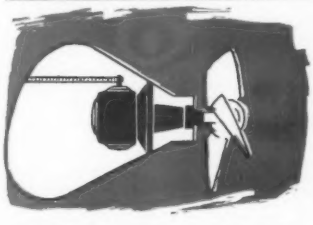
SUB-FLOOR . . . for towline or special equipment



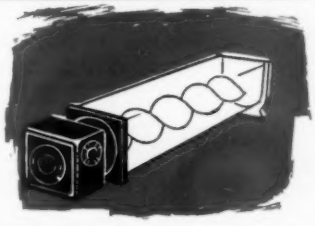
90° MOUNTING . . . for heavy-duty metal saws and machines



VERTICAL . . . base mounting for power turntable machines



SIDE MOUNTED . . . paint, pulp, liquid, or chemical agitators



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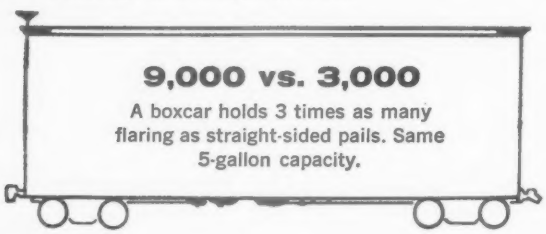

SINGLE ELECTRICALLY WELDED SEAM FOR STRENGTH

Continental's Flaring Pails are rugged enough to take even the roughest punishment. The single electrically welded seam adds strength to the pail...gives leakproof protection for every product.

CONTINENTAL CAN COMPANY

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Cuban Office: Apartado 1709, Havana

SOME NOTES ON ORGANIZATION

Decisions are made by men with vision, good judgement, foresight, and those willing to take risks.

By
Lawrence Shatkin

Clarence B. Randall stated, "the organization chart is a useful scaffold with which to build a house." An organization is composed of people and as such, the organization chart should represent a dynamic concept rather than a static one. It should form the framework of many thought-provoking ideas and lay the foundation for theoretical approaches towards improved business performance.

Managing By Decentralization

After World War II, companies began to decentralize their operations because the size and complexity of the business, the technological innovations, and the diversification of businesses created a demand for greater and better decisions. This meant that the authority for making these decisions had to be shifted to the point or scene of action. Each executive had to become a better manager for he was now responsible for the profit or loss of his center of activities. Naturally, this brought about increased responsibilities of managers down the line. It also meant that a manager would have to learn the "art of delegation," for this would help managers to develop themselves and learn by their mistakes.

Types of Decentralization

Decentralization may be either managerial or geographic, or both. It is geographic when there are several plants in different locations, and managerial through the delegation of authority, so that decisions are made at the lowest level of supervision where you can expect intelligent decisions to be made.

Risks and Rewards of Delegating

Delegation means to entrust to another and as such carries with it the danger of a trust miscarried. Any task delegated should be planned so that it becomes a clearly defined part of the total job to be done. Most executives would agree that delegation of responsibility and authority is necessary for one's own growth.

In the delegation of work, authority must accompany the responsibility. This seems so obvious yet, the real authority does not parallel the responsibility extended. If a subordinate hasn't received enough authority to do the job, by the very definition of delegation he has not assumed full responsibility. We must remember that delegation involves responsibility in the work that is delegated the authority necessary to carry out, the responsibility, and accountability, which is the obligation of the delegatee to carry out the assignment. Accountability cannot be delegated.

Subordinates should be encouraged to anticipate their needs. This will encourage them to think critically, offer suggestions, and enable them to become more alert. They should be involved in the planning function of the responsibility that is delegated to them, and this should result in new ideas and loyalty. This phase called decentralization requires a high calibre of executives since they are responsible. for the functioning of their unit.

Manpower Analysis, Job Descriptions

The objective of planning the organization structure is to provide for coordination of the activities of the group. The organization

The opinions expressed in this feature are not necessarily those of any particular firm or organization.

chart is a graphic portrayal of certain aspects of the organization, and in a penetrating analysis is useful to prepare written descriptions of executive positions. This organization chart can be extended to describe the factory organization down to the men in the plant, and from an analysis, one can project any changes or needs in manpower as new methods for improved efficiency are introduced. Job descriptions become a way of describing the flow of work in terms of the people who have to carry it out. In writing such job descriptions and in working out the organizational structure in terms of the various processes which have to be carried out if the business is to operate, management can then distinguish between the places where stresses occur between people as a result of bottlenecks in the flow pattern, unclear policies or responsibilities, and incompatible personalities. It may be necessary to redefine jobs to fit the personalities in the company. We must remember that a change in production or technology affects organizational relationships.

Parkinson's Law

This is usually described as the rising pyramid brought about by two forces: officials are interested in increasing the number of subordinates reporting to them, sometimes referred to as "empire building," and the tendency for work to multiply.

Coordination

The responsibility for achieving coordination is a top level function. It involves timing and unifying activities through a system. Activities must be kept in balance at each level of authority. In a paint factory where several activities are taking place simultaneously, coordination is necessary to ensure a continuous work-flow-pattern in the form of raw materials arriving at one end, to the shipment of finished goods at the other extreme. This involves teamwork, and each department must be flexible to transfer their men to fill any gap that may arise. The foremen, to be effective, must be able to coordinate the efforts of their men in their department to reach their objectives. This may evince one foreman crossing organizational lines to discuss a point with another foreman on the same level as he. This should be encouraged. Recent studies indicate that the more effective foreman spends the least amount of time with his workers.

New Trends

The use of electronic data processing equipment is causing companies to reconsider moving back to centralized decision making. The speed of information feed-back is changing previously complex jobs to routinized jobs which may widen the gap between middle and top management. Information technology should allow fewer people to do more work, and this should make centralization easier.

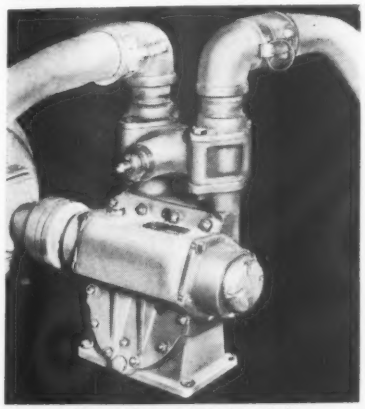
The organization chart should be used as an audit of human resources. It is necessary to serve as a reference point which changes with the needs of the time. Organizational lines should be clearly drawn and responsibilities mapped out. Staff positions should be introduced only after consultation with line men with whom the specialists will be working.

However, the chart itself will not get things done. Decisions still have to be made by men with vision, good judgment, foresight, and those willing to take risks.

PUMPING LATEX PAINT

Coagulation problem solved with new Archimedean pumping principle.

SAPOLIN Paints Inc., Brooklyn Plant, is successfully using Goodyear's principle of the rubber-to-metal-wiping action which creates a non-foaming, pulseless axial flow. This wiping action, which is similar to the action of a windshield wiper, is accomplished by the Buna N bonded stainless



Diagonally split casing in the pump allows for easy and quick servicing or cleansing. Gentle wiping action of the rubber bonded plate wheel with the steel screw cuts down greatly on friction, thereby lessens need for maintenance.

plate—wheel on a strainless steel screw.

The Goodyear stainless steel pumps are pumping latex based paints at 1800 r.p.m. and with no galling, shearing or separation of the shear-sensitive paint. The tapered roller bearings on both ends of the shaft permit operating speeds up to 3600 r.p.m. These pumps have been very effective for Sapolin Paints Inc., New York, N. Y. Charles Butera, Plant Engineer, at Sapolin's Brooklyn factory, said: "Our problem is the handling of special latex formulations whose mechanical stability is so critical that any stress, internal or external incurred in excessive dispersion, pumping or handling, can cause separation and paint wastage.

"Formerly there was a tendency toward coagulation of borderline products which might be met in latex formulations." Mr. Butera continued, "Because of the fundamental engineering incorporated in their pump, we feel Goodyear has solved this problem".

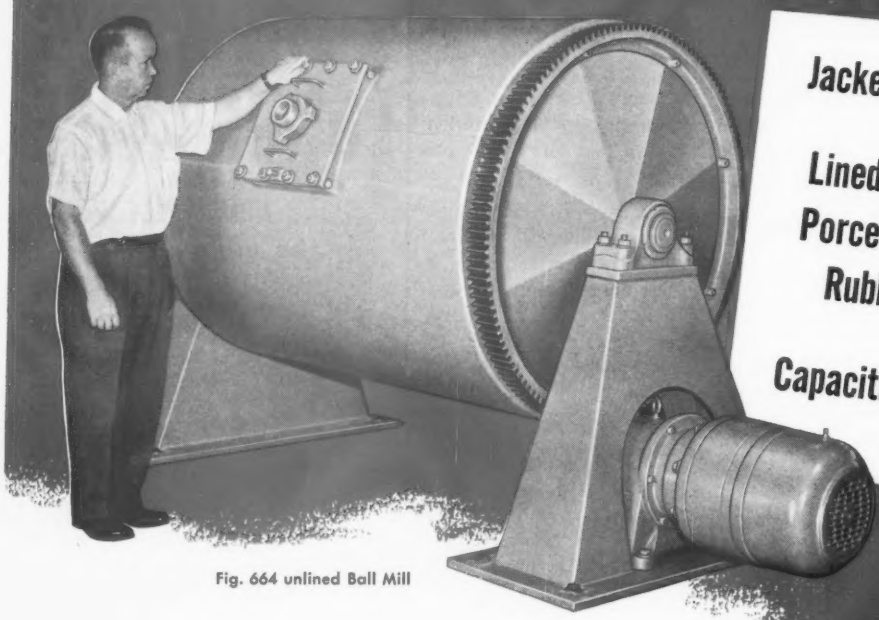
The diagonally split casing permits the quick and simple removal of the cover for cleaning purposes and easy replacement of the rotating element without disturbing the piping connections. This feature considerably reduces expensive down time costs.

The Goodyear pumps, ranging in capacities from 1 g.p.m. to 220 g.p.m., are self-priming, maintain suction lifts up to 30 feet and are available in meehanite, bronze, aluminum or stainless steel with either Buna N or Viton 'A' bonded stainless steel parts. Sapolin is able to obtain capacities ranging from 20-25 g.p.m. with this pump.

For further information write: Goodyear Pumps Inc., Nine Rockefeller Plaza, New York, N. Y.

The pump, as it is used at the Sapolin paint factory.

"U. S." Ball and Pebble Mills



Jacketed or Unjacketed

•

Lined with Buhrstone, Porcelain, Hi Alumina, Rubber or Unlined

•

Capacities to 4,000 gal.

Fig. 664 unlined Ball Mill

Built to exacting design standards, "U.S." Ball and Pebble Mills offer many features that contribute to long, relatively maintenance-free operation. The heavy steel plate cylinder is welded to fabricated steel heads with extra heavy shrouded reinforcing ribs. The cylinder is supported by integral trunnions, precision-machined, to operate in anti-friction bearings mounted on sole plates. The dust-tight tapered roller bearings have a life expectancy of better than 300,000 hours. The cylinder is equipped with a wide face, fine tooth machine cut ring gear, precision fitted and bolted to a machined seat. The matching pinion is mounted on an oversize countershaft supported by rugged anti-friction bearings. These mills are built to stand up under the most punishing service you can give them . . . year after year.

FIG. 564 SOLID PORCELAIN PEBBLE MILL

Made in seven sizes: 12, 27, 52, 87, 117 and 210 gals. These mills feature an alumina fortified porcelain body for long wear and minimum contamination. In the three smaller sizes the grinding jars are one-piece. In the larger sizes the jars are made in three pieces, match-fitted and cemented into a heavy steel housing.

"U.S." Ball and Pebble Mills are fully described in Bulletin BM-290. Contains complete specifications on the full size range, drive details, controls and optional accessories. Write for your copy today. Address Process Equipment Division, U.S. Stoneware, Akron 9, Ohio.

269-G

OUR 101st YEAR

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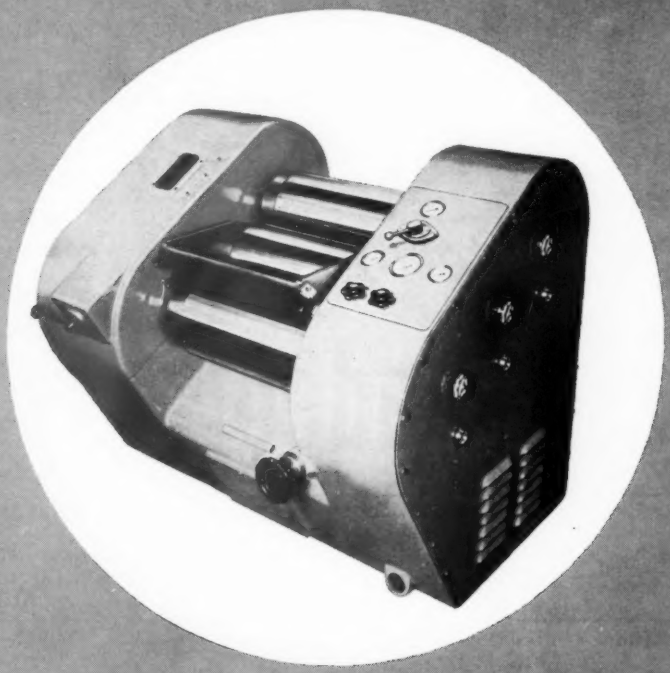
New fully hydraulic

BUHLER 3-Roll Mill



SDA
Roll Dimensions: 10" x 20"

SDT
Roll Dimensions: 16" x 32"
16" x 40"

• Up to 60% higher output

• Absolutely even pressures for uniformly fine grinding

1. New hydraulic regulating system provides absolute pressure stability and easiest (1 second) setting of rolls.
2. Determines exact pressure for any formula and duplicates it for that formula at any time.
3. Rolls disengage for cleaning in *1 second.* A simple hand-lever shift disengages rolls and scraper blade instantly. By shifting hand-lever back to operating position, rolls and scraper blade are restored to the exact pressure they were set at before disengaging.
4. New feed hopper arrangement increases working surface. Hopper cheeks do not rest on the roll, but are hydraulically pressed to the shoulder of the roll; permit grinding across the whole length of the roll, with even wear.
5. Hydraulically operated scraper blade maintains selected pressure irrespective of wear. Never loses pressure — hydraulic control takes up automatically to maintain exact selected pressure with wear.
6. Can be furnished with variable speed drive for the first roll, or driven by a 2- or 3-speed motor. Regulating the speed of the first roll for paints and inks of different consistencies increases the capacity 60% and more.

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6 ways
to meet
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of your
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AZO leaded ZINC OXIDES

TYPE		AZO 50-L	AZO 35-L	AZO 35-M	AZO 18-L	AZO 18-L-S	AZO 12-L
		Cofumed	Cofumed	Blended and Acicular	Cofumed and High Basicity	Blended and Acicular	Cofumed
Consistency in Paint		Low	Low	Medium	Low	Medium Low	Low
Specific Gravity		5.95	5.85	5.85	5.75	5.75	5.70
Weight Per Solid Gallon (Pounds)		49.56	48.73	48.73	47.90	47.90	47.48
One Pound Bulks (Gallons)		0.02018	0.02052	0.02052	0.02088	0.02088	0.02106
Per cent Zinc Oxide (Approximate)		50	65	65	82	82	88
Per cent $PbSO_4$—PbO (Approximate)		50	35	35	18	18	12
Per cent Basicity (Expressed as Lead Oxide-PbO)		12–14	6.5–8.5	6.0–7.5	7–7.5	6–7	0.5–1.0
Specifications	ASTM	D80–41	D80–41	D80–41	D80–41	D80–41	D80–41
	Federal		TT-Z-321a	TT-Z-321a			

The properties you want most in your exterior paints can begin right here . . . with the AZO leaded zinc oxides you need for durability and mildew resistance in your primers and top coats.

AZO cofumed leaded zinc oxides have excellent mixing and dispersion qualities and produce the lowest consistency in paint. AZO blended type leaded zinc oxides generally give higher consistency and improve color. Both types have uniform consistency within grades—help minimize mixing problems in your plant.

To meet your exact requirements, specify AZO brand zinc oxides: leaded, lead-free . . . and the exclusive de-aerated AZODOX form.

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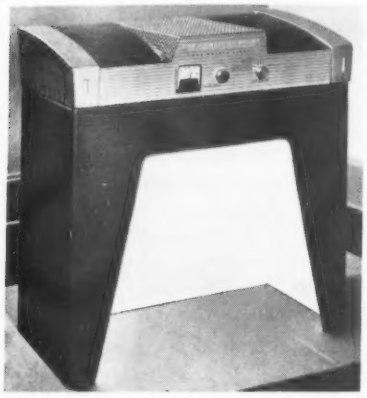
NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



GAMAIN

GENERATOR
Reconstructs Natural Daylight

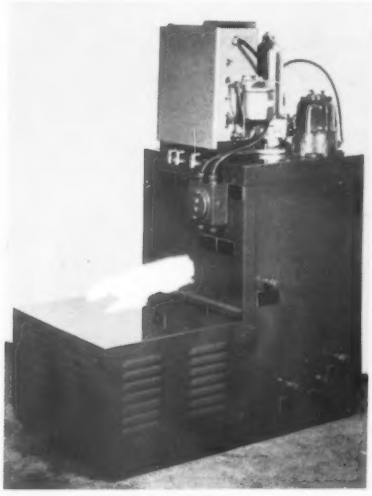
Accurate comparison of colors and color identification can be accomplished the firm says, only with a scientifically engineered instrument designed for this purpose.

New generator is designed to reconstruct natural daylight so that colors can be correctly appreciated or compared under a light which possesses all the daylight radiations in proper proportions, quantities and qualities.

The spectral distribution of daylight has been accurately measured by the firm's engineers and is scientifically applied to all of the various light sources available with this new generator. These light sources are accomplished by use of incandescent, blue fluorescent, daylight fluorescent, and color filters which are all blended by manual control to duplicate the desired type of artificial daylight. Black light (ultra-violet) is also used to check the quality of bleach of white materials and for inspection of materials treated to fluoresce.

It is important to have the many variations of artificial light that can be produced by the new generator. With these various settings, colors can be compared for color matching and for appearance in artificially lighted homes, offices, stores, factories as well as in natural daylight.

The Gamain Co., Dept. PVP, 5th and Richmond, Kansas City, Kansas.



BROOKFIELD

STREAM ANALYZER
Safety Purging System

New stream analyzer is an integrated viscosity controlling package permitting the removal of fluid from a pressurized line, measurement of its viscosity, and its return to the line. When used with the company's viscometran, viscosity measurements can be made on any flowing stream within wide pressure and temperature limits.

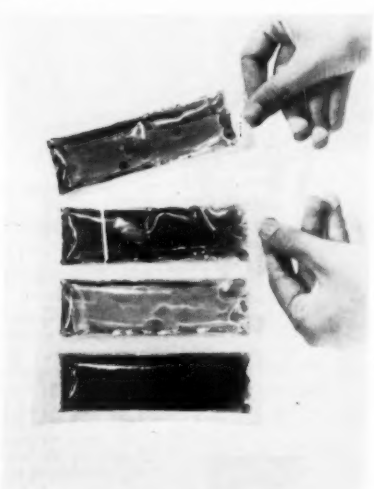
Equipped with two gear pumps driven by a single explosion-proof motor, the stream analyzer will produce a steady flow of 1 gpm through a sampling chamber in which the viscosity measurement is made. The total volume of the chamber is 0.3 gallons to insure the system's quick response. The system will handle material up to 550°F, with provision for accurately measuring temperature of the flowing stream. After measurement the material is returned to the line from which it was taken, the maximum line pressure being 150 psi.

Brookfield Engineering Laboratories, Inc., Dept. PVP, 15 Cushing St., Stoughton, Mass.

COLLOIDAL DISPERSIONS
Aqueous, Solvent Compatibility

New series of dispersions of carbon blacks is available in either butyl alcohol or isopropyl alcohol. These colloidal dispersions are being marketed under the "Alcoblaks" trade name. Four different carbons in each of the alcohols are currently available. Laboratory tests indicate good compatibility with many resins in aqueous as well as solvent systems.

Columbian Carbon Co., Dept. PVP, 380 Madison Ave., New York 17, N. Y.



SPEEDWAY

FILLING MACHINE
Leak-Proof Packaging

New automatic liquid filling machine that forms, fills and seals pouch-type containers for liquids, creams and pastes is now being offered.

Known as Model LF-60, the ma-

chine forms leak-proof packages from roll stock of cellophane, foil, pliofilm, polyethylene, or laminated combinations. Package sizes range in length from 1″ to 12″, and in width from ¼″ to 8½″. Virtually any combination of single or cluster packages within this range can be produced. Adding to this versatility, a new design principle permits future die and tooling changes in less time and at lower cost than possible with any similar equipment.

Employing two independently operated packaging stations, the machine has a variable speed of 15 to 36 strokes per minute. This, with each station producing a cluster of four packages (as illustrated) for example, capacity is from 120 to 288 packages per minute. Models with single stations also are available. Since there are no electronic or other complicated parts, the unit can be operated and maintained by semi-skilled workers. Dimensions at the base are 44″ x 48″. Over-all heighth is 6½ feet. Power requirements are 115-230 volts, 60 cycles, single phase.

The manufacturer will adapt the machine to fit individual needs, including the packaging of dry materials.

Speedway Machine & Tool Co., Inc., Dept. PVP, 1802 N. Luett St., Indianapolis 22, Ind.

MELTRONICS

DEW DETECTOR
High Impedance

The model 5217 dew detector is a new instrument, with high impedance, millivolt relay, coupled with a sensor of special design, in such a way that it will detect presence of moisture with a very high order of sensitivity—more so than former dew-point measuring apparatus and record the total "time-of-wetness."

It has a threshold adjustable from 0.05 to 0.4 volts and a differential of 0.03 volts. Input impedance is 10 megohms.

Its largest application to date has been in corrosion analysis studies. It is expected to have other applications in corona studies or anywhere that a precise indicator of the presence of moisture is required, or where automatic control of apparatus during wet or dry periods is needed.

Meltronics, Inc., Dept. PVP, 1010 N. Main St., Elkhart, Ind.

YELLOW VAT PIGMENT
Weathering Fastness

New golden yellow vat pigment for automobile and other top-quality finishes is being introduced.

Its transparency is of value in the production of brilliant clear finishes over bright metal, or when it is used in conjunction with metallic pigments to give gold shades of outstanding fastness, in either nitrocellulose or baking media.

The new pigment, which is a pure pigment dyestuff, has good dispersion properties and excellent stability in all types of media, showing considerable superiority over existing yellow pigments. It will be valuable as a shading component for greener-shade yellows and on its own it provides a useful basis for bright cream shades and sunshine yellows.

In alkyd baking enamels, "Monolite" Fast Yellow FRS has excellent

heat fastness, with no tendency towards migration. It is non-blooming, non-bleeding, into white baking overspray lacquers, and its performance in nitrocellulose media is equally satisfactory. For these reasons this pigment is expected to find immediate acceptance in the important car finish field.

Subsidiary uses of importance are expected to be found in roller coating enamels and tin-printing inks, while in the plastics field the new pigment shows excellent stability in PVC, with very high light fastness and complete freedom from migration and contact bleed.

Chemicals Division, Canadian Industries Limited, Dept. PVP. P. O. Box 10, Montreal, P. Q.

CONVEYOR BELT
Corrosion-Resistant

Lower horsepower requirements, simplified assembly and installation, a body depth one-half that of previous models, and a new belt design that permits conveyor lengths up to 500 feet, are features of a newly redesigned unitized all-metal belt conveyor.

In addition, the new conveyor features a continuous speedbar channel on both sides of the conveyor. This channel permits the fastening of side tables, deflectors, electric controls, and other attachments at any point along the sides of the conveyor without the need for drilling. This channel can also be used to connect legs or ceiling supports at any position to suit building conditions or to clear obstructions. Items are fastened to the channel by means of ¼″, 5/16″, ¾″ or ½″ bolts.

The metal belt of the conveyor is made of smooth, zinc-coated steel, which has excellent resistance to oil solvents, and corrosion. The belt is designed so that the gap between slats does not exceed .015″ even when turning around the sprocket. Belt widths from 12″ to 36″ are available. It is self-tracking with an improved track design which permits push-on or push-off of heavy loads from the sides without disturbing the belt.

As with previous models, the conveyor is made in standard 10 foot

sections and any number of sections may be easily connected to form a one piece conveyor up to 500 feet in length. Standard vertical curves of 5°, 10°, 15°, and 20° may be used for multi-level conveying. Conveyor sections may be added or removed, as needed, to meet new plant layouts and changing conditions.

The conveyors feature a positive sprocket drive which assures exact speed synchronization and automatic holdback on inclined and vertical conveying. Hardened steel ball-bearing rollers running on a smooth steel track keep horsepower requirements low while providing speeds up to 60 feet a minute. The belt of the conveyor does not stretch and is not affected by humidity. An automatic take-up compensates for heat expansion when the conveyor is used for heat expansion when it is used for oven conveying.

Because of its heavy duty bed design, legs or ceiling supports may be placed on 10 foot centers. By means of the speedbar channels, however, they can be placed at any position without drilling. Legs have a 6″ adjustability to compensate for unlevel floor areas.

As a safety factor to prevent worker injury and to minimize maintenance, the sides of Armorbelt conveyors are totally enclosed. The body depth of the newly designed conveyor is only 4¼″ compared to 10½″ for previous models.

M-H Standard Corp., Dept. PVP, 515 Communipaw Ave., Jersey City 4, M. J.

HANSA YELLOW PIGMENTS
Improved Durability

New light resistant hansa yellow pigments developed for use in exterior latex paints have recently been introduced. They are Permansa Yellow L Lemon shade 12186, Permansa Yellow R Medium shade 12185 and Permansa Yellow RA Medium shade 12187.

These new pigments with their improved durability fill the need for more light resistant hansa yellows created by the increased use of latex paints in exterior applications. The chrome yellows are not bright enough and contain lead; vat yellows are too expensive; and conventional hansa yellows are not light resistant enough.

Pigment, Color and Chemical Div., Sherwin-Williams Co., Dept. PVP, 260 Madison Ave., New York 16, N. Y.

CAN CLIPS
Assures Safe Transportation

Safety through the mails or by any other conventional means of transportation including air freight is assured by new triple-grip can clips.

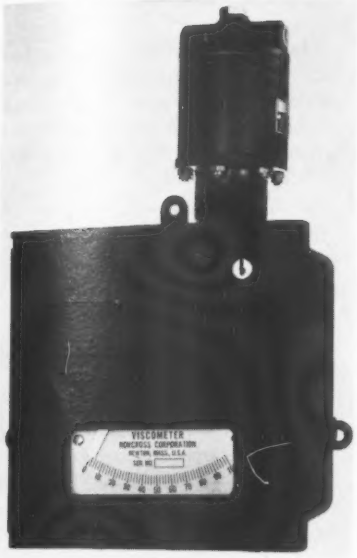
No training or experience is needed to apply these simple little U-shaped metal clips around the lid of a friction top can. For example, to seal the lid of a typical gallon-size paint can, five triple-grip can clips are equally spaced around the circumference of the can. The clips are then pushed into the upper part of the lid groove with only light pressure with the thumb. And then they are securely forced into the groove with an upward movement of a can clip applicator.

The applicator wedges part of the clip down into the groove while the ends of the clip clamp securely.

Once a friction top can lid is sealed with the triple-grip can clips, it stays sealed and will safely travel across the city by truck, from one end of the country to the other by rail, or around the world by all means of transporting goods.

Freund Can Co., Dept. PVP, 4445 S. Cottage Grove Ave., Chicago 53, Ill.

NEW MATERIALS — EQUIPMENT



NORCROSS

VISCOMETER
High Sensitivity

New viscometer model IP is used with any measuring elements that have been designed to measure in open tanks, pressure or vacuum vessels, or in pipe lines.

The IP model receives an electrical signal from a measuring element and provides a 3 to 15 p.s.i. output in addition to indicating viscosity. This air signal permits the use of all types of pneumatic control and makes it possible to use the firm's viscometers with any manufacturer's pneumatic receivers and controllers. Also by suitable transducers or converters various electric receivers can be used with the viscometers.

Measuring elements all use the proven falling piston principle which inherently provides high sensitivity and repeatability with a simple rugged instrument necessary for viscosity process control. A piston is periodically raised within a cylinder and the time required for it to fall a fixed distance by gravity is a measure of viscosity.

Norcross Corp., Dept. #N47-PVP, Newton, 58, Mass.

LEAD PIGMENT
Corrosion-Resistant

New treatment of standard leafed metallic lead pigment has been developed. A stearic-free dry flake metallic pigment form (Mark V) of the ductile metal now makes possible the use of the excellent corrosion resistant properties of virgin leafed metallic lead in epoxy based systems. The resulting epoxy compositions can be applied by trowel, brush, or spray depending on the need of the user. In addition to the standard maintenance applications, excellent results have been obtained in chemical plant service as well as for the shielding of nuclear and x-ray installations.

Metalead Products Corp., Dept. PVP, 2901 Park Blvd., Palo Alto, Calif.

FILTER CARTRIDGE
Stainless Steel Core

The adaptability of the new filter cartridge to a wide range of liquid-chemical filtering applications has been increased by the availability of an optional stainless steel core.

In announcing the use of Type 304 stainless steel as core material, company spokesman report liquid filter cartridges are now ideally suited for filtering installations where nearly any chemical or corrosive condition exists.

The cartridge, designed on an entirely new filtering principle, has been in production use for more than a year with an aluminum core and has been found to be an ideal

filtering medium in all installations where chemical deterioration is not a major factor.

With the new stainless steel core, the firm's engineers have opened new horizons in industrial filtration. The new core of Type 304 stainless steel has been found through exhaustive field and production tests to offer suitable chemical resistance for almost all chemical applications.

The design of the new Afco cartridge uses custom-engineered synthetic fibers of selected diameter. Consistent cartridge density throughout the micron range is assured and because of the unique construction of the cartridge, increased solids capacity, lower pressure drop and a more uniform performance are assured.

The filter cartridges provide "depthwise" filtration rather than "surface" filtration and the filtering action takes place through the filter media bed.

American Felt Co., Dept. PVP, 2 Glenville Rd., Glenville, Conn.

GUMMED LABELS
No Pre-Sticking

New gummed labels printed on prone paper stock, is reportedly completely unlike ordinary paper stock. It handles and stores just like plain paper. It has a "relaxed" quality so that it lies flat without pre-sticking or curling through extreme variations of temperature and humidity. Yet it has sufficient body and bulk to handle well in a labeling or imprinting machine.

The firm offers labels printed on this remarkable paper in product-identifying and standard address types. Available are a variety of finishes, single and multi-colors, plain or varnished.

Kalamazoo Label Co., Dept. PVP, 321 W. Ransom St., Kalamazoo, Mich.

HEXAMETHYLENETETRAMINE
Low Odor

Hexamethylenetetramine, available under the name "Ucar hexa," serves as a convenient, low-odor source of anhydrous formaldehyde.

Hexamethylenetetramine reacts chemically as formaldehyde, but without liberation of water. This property eliminates the undersirable irritating odor that is characteristic of formaldehyde in water solutions. The widest use of Ucar hexa is as a cross-linking agent in novolac resins to make dry mixes for molding, fiber-bonding, grinding-wheel, and foundry applications. It is also used in novolac varnishes for cross-linking when the dried resins are heated. These varnishes are useful for impregnating paper and fabrics for laminates and high-strength molding applications. Ucar hexa can also be used both in the manufacture and curing phenolic resins as well as an alkaline catalyst replacement for ammonium hydroxide in the production of one-step, phenol-aldehyde resins.

It is also an insolubilizing agent and hardener for adhesives, coatings, and finishes based on proteins such as animal glue, casein and soya. It serves as a corrosion inhibitor during acid pickling of ferrous metals, as a rubber accelerator, as an acidity deactivator for inert carriers in Endrin insecticide dusts, as a starting material for cyclonite (RDX)- and other high explosives, and to form chemical complexes with phenolic compounds in solvent purification of petroleum streams.

Product is available in four grades—powdered or crystalline, with or without a free-flow agent.

Union Carbide Chemicals Co., Dept. PVP, 270 Park Ave., New York 17, N. Y.

PATENTS

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Malemide-Modified Oils

U. S. Patent 2,948,693. Pliny O. Tawney, Passaic, N. J., assignor to U. S. Rubber Co., New York, N. Y., a Corp. of N. J.

The liquid products of reaction of maleimide and an ester of a non-conjugated olefinic non-hydroxylated aliphatic acid having from 12 to 24 carbon atoms with a saturated aliphatic alcohol, said products being substantially free of insoluble polymers of said maleimide.

Preparation of Resins from Diisocyanates

U. S. Patent 2,947,714. Rene Laclercq, Woluwe-Saint-Pierre and Rene Paquet, Braine-le-Comte, Belgium, assignors to Union Chimique Belge, S. A., Brussels, Belgium, a Corp. of Belgium.

A process for the preparation of diisocyanate resins which comprises reacting at a temperature between 100 and 300°C. and in the presence of an inert gas, materials consisting essentially of at least one diisocyanate of the general formula OCN—R—NCO wherein R is selected from the group consisting of aliphatic and aromatic bivalent radicals with a mixture of at least two monohydroxylated compounds selected from the group consisting of allyl, benzyl, furfuryl and abietyl alcohols, phenol and nonylphenol, the molecular ratio of the diisocyanate to the monohydroxylated compounds used being about 1:1.

Protective Coating Compositions

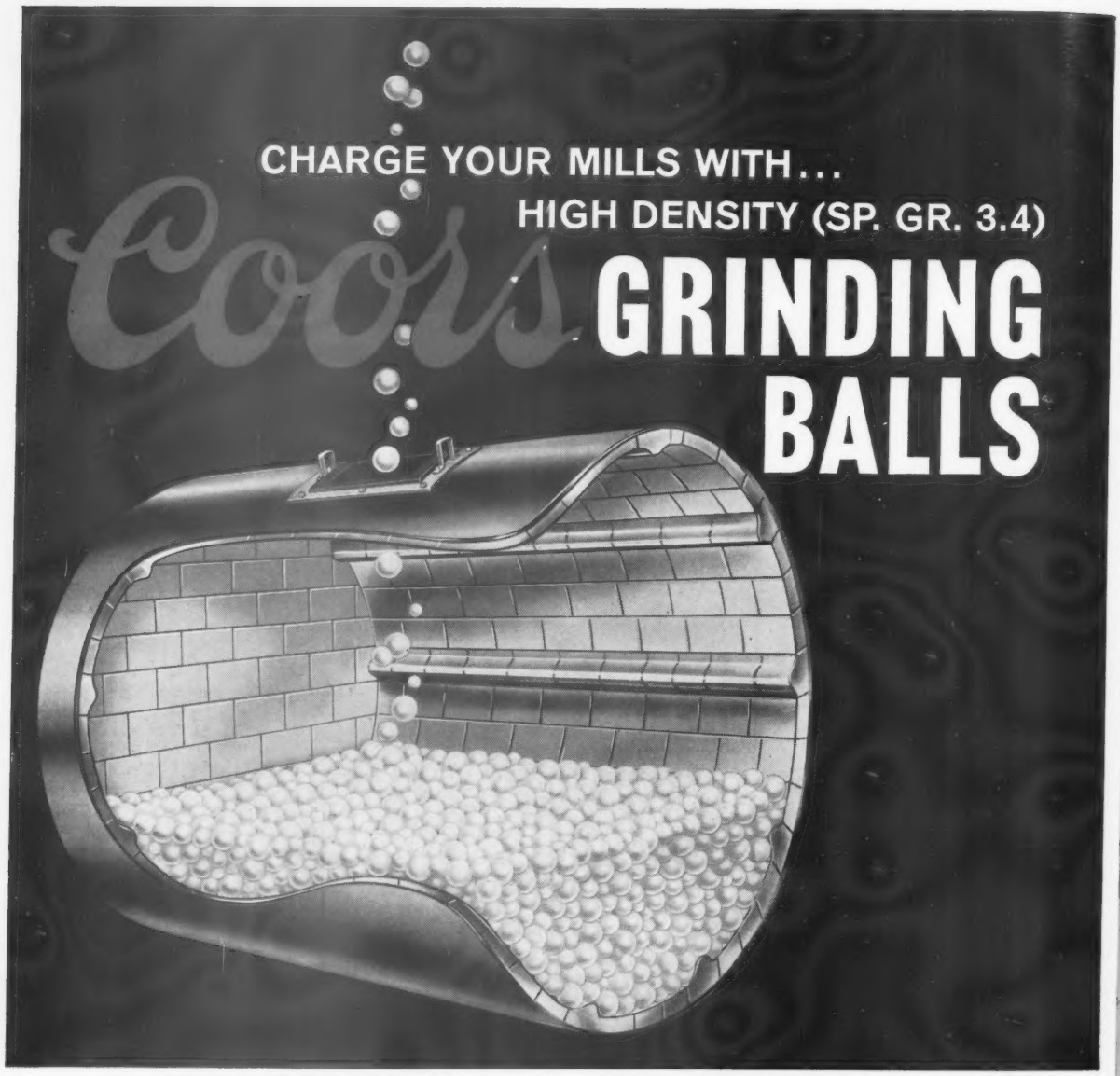
U. S. Patent 2,947,713. Merrill E. Jordan, Walpole, and William G. Burbine, Whitman, Mass., assignors to Godfrey L. Cabot, Inc., Boston, Mass., a Corp. of Mass.

A novel substantially transparent, protective film forming, costing composition characterized by exceptionally high gloss and hold-out properties which comprises varnish and as the sole pigment contained in said composition pyrogenic colloidal silica, said varnish being a mixture of tung-oil type oil and organic resin in a ratio of from about 8-40 gallons of said oil per 100 pounds of said resin and said silica being the product of flame hydrolysis of a silicon tetrahalide at elevated temperatures, having an average discrete particle size of below about 50 millimicrons, and being present in pigment volume concentration of from about 1.67-7, the finished film from said composition having a 60° gloss value as determined by the Photovolt reflection meter of at least 90%.

Epoxide Resin Compositions

U. S. Patent 2,947,712. William J. Belanger, John E. Masters, and Darrell D. Hicks, Louisville, Ky., assignors to Devoe & Raynolds Co., Inc., a corp. of N. Y.

In the process for heat curing glycidyl polyethers of polyhydric compounds selected from the group consisting of polyhydric alcohols and phenols having at least two phenolic hydroxyl groups, said glycidyl polyether containing more than one epoxide group per molecule, and having an epoxide equivalent below 1000, with polycarboxylic acid anhydrides wherein a ratio of two anhydride equivalents to two epoxide equivalents is employed, the improvement which comprises incorporating 0.01 to 0.8 equivalents of a monohydric alcohol in the glycidyl polyether-anhydride mixture prior to effecting the cure, and heating the mixture wherein the anhydride groups react with hydroxyl groups resulting in carboxyl groups which in turn react with epoxide groups of the glycidyl polyether to form a cured composition, considering an epoxide equivalent as the weight in grams of glycidyl polyether per epoxide group, an equivalent of a monohydric alcohol as the weight in grams of one mol of the monohydric alcohol and an anhydride equivalent as the weight of acid anhydride in grams per anhydride group.



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Epoxide Compositions

U. S. Patent 2,947,711. Harold G. Cooke, Jr., and John E. Masters, Louisville, Ky., assignors to Devoe & Raynolds Co., Inc., Louisville, Ky., a Corp. of N. Y.

The method of converting an epoxide compound having a plurality of epoxide groups selected from the group consisting of (1) glycidyl ethers of polyhydric phenols, (2) glycidyl ethers of polyhydric alcohols, and (3) epoxidized esters of an unsubstituted polyhydric alcohol which is free of non-benzenoid unsaturation and at least one of the acids from the group consisting of oleic and linoleic acids into cross linked infusible, insoluble reaction products which comprises heating said epoxide compound with a maleic-anhydride rosin acid adduct having an acid anhydride group and a free carboxyl group in proportions of from about 0.2 to about 2.0 epoxide equivalents of the epoxide compound to one carboxyl equivalent of the adduct, said adduct being produced by the reaction of maleic anhydride with rosin acid, and said heating being carried out at a sufficient temperature for a sufficient length of time to convert the reaction mixture into an infusible, insoluble reaction product.

Diglycidyl Compounds

U. S. Patent 2,951,049. William Kammerer, Jr., Bethesda, Md., assignor to American Cyanamid Co., New York, N. Y., a Corp. of Maine.

A process for producing an oil-modified alkyd resin comprising the steps: (1) esterifying at a temperature in excess of 200°C. a polyhydric alcohol, a polycarboxylic acid free of non-benzenoid unsaturation and a mono-carboxylic modifier selected from the group consisting of fatty acids having from 8 to 18 carbon atoms and partial polyhydric alcohol esters thereof until an acid number between about 15 and 50 is obtained, said esterification product being substantially free of hydroxyl groups, thereupon, (2) reacting to completion as indicated by an acid number not greater than 13 at a temperature between about 130°C. and 260°C. the esterification product of said step (1) with a diglycidyl ester of a dicarboxylic acid on the basis of from about 0.5:1.5 equivalents of oxirane oxygen as represented by said ester per equivalent of uncondensed carboxyl groups contained by the esterification product of said step (1).

Water-Soluble Copolymers

U. S. Patent 2,946,773. Wilhelm E. Walles & Wililam F. Tousignant, Midland, Mich., assignors to The Dow Chemical Co., Midland, Mich., a corp. of Del.

A normally solid copolymer consisting essentially of between about 1 and 99 weight percent, based on the weight of the copolymer, of copolymerized N-vinyl-5-ethyl-2-oxazolidinone with between about 99 and 1 weight percent, based on the weight of the copolymer, of copolymerized N-invyl-5-methyl-2-oxazolidinone.

Coating Composition

U. S. Patent 2,942,995. Nathan B. Hughes, 5805 Ruatan St., Berwyn Heights, Md.

An improved liquid coating composition consisting essentially of the following ingredients:

	Parts by weight
Castor oil	1
Benzol	2
Beeswax	2
Turpentine (redistilled)	48
Spar varnish	26

Stablized Vinyl Resin Compositions

U. S. Patent 2,944,045. Chrysosthenis M. Cararios, Maple Heights, Ohio assignor to The Harshaw Chemical Co., Cleveland, Ohio, a corp. of Ohio.

A heat stable vinyl resin composition comprising 100 parts of a resin selected from the group consisting of polyvinyl chloride nomopolymers and polyvinyl chloride copolymers and from 0.1 to 15 parts of each constituent of a stabilizing component, having the property of retaining stability after long periods of vinyl resin composition storage, and stabilizing component consisting of a metal salt of a higher fatty acid selected from the group consisting of barium and lead salts of higher fatty acids and mixtures thereof and a metal oxide of the class consisting of lead oxide, barium oxide, calcium oxide, magnesium oxide and mixtures thereof.

Non-Burnishing Flat Paint

U. S. Patent 2,941,891. Anthony J. Page, North Plainfield N. J., assignor to Johns-Manville Corp., New York, New York, a Corp. of New York.

A non-burnishing paint having a 60° specular gloss of less than approximately 10 and a pigment volume of approximately 50 to 70% and having incorporated therein approximately 35 to 65%, by weight of the total pigments, of irregular, fragmentary, mineral particles having a Mohs hardness of at least approximately 3 and a size classification sufficient to allow retention of substantially all particles of Standard 325 mesh, a maximum of approximately 70% through 200 mesh and substantially all to pass 60 mesh.

Heat Hardenable Coating

U. S. Patent 1,940,945. Roger M. Christenson, Richland Township, and Harold G. Bittle, Gibsonia, Pa., assignors to Pittsburgh Plate Glass Co., a Corp. of Pennsylvania.

A heat hardenable resinous composition comprising an alkyd resin, and an interpolymer of an acrylamide with at least one other monomer having a $CH_2=C<$ group, said interpolymer being characterized by having amido hydrogen atoms replaced by the structure

$$-ROR_1$$

wherein R is a saturated lower aliphatic hydrocarbon radical having its free valences on a single carbon atom, and R_1 is a member of the class consisting of hydrogen and lower alkyl radicals.

Corrosion- and Fungus-Inhibiting Composition

U. S. Patent 2,943,909. Aaron Wachter, Oakland, & Rita Wieland, Berkeley, Calif., assignors to Shell Oil Co., a corp. of Dela.

A composition comprising about 25-75% by weight of a nitrite of the group consisting of dicyclohexylammonium nitrite and diisopropylammonium nitrite and about 75-25% be weight of a nitrophenate of the group consisting of cyclohexylammonium nitrophenate and dicyclohexylammonium nitrophenate.

Vinsol-Epoxy Compositions

U. S. Patent 2,948,694. Francis E. Reed, Louisville, Ky., assignor to Devoe & Raynolds Co., Inc., a Corp. of N. Y.

A composite article comprising at least two elements adhered together by a thin layer of a cured composition containing as its sole reactive ingredients Vinsol, a dark colored, hard, pine resin which is soluble in aromatic hydrocarbons, substantially insoluble in petroleum hydrocarbons and has an acid number of 90 to 105, and an ethoxyline resin selected from the group consisting of monomeric and straight chain polymeric epoxy ethers, esters and oils having molecular weights of 250 to 8,000, and at least one of the ethoxyline resin cross-linking agents, urea and melamine aldehyde resins, amines, amides, boron trifluoride amine complexes and polycarboxylic anhydrides.

Film-Forming Compositions

U. S. Patent 2,949,438. Darrell D. Hicks, Louisville, Ky., assignor to Devoe & Raynolds Co., Inc., a Corp. of N. Y.

A film forming composition comprising (1) a poly epoxide selected from the group consisting of glycidyl polyethers of polyhydric alcohols and phenols, and epoxidized esters, polyesters, drying oils, diolefins and cyclic aldehyde condensates each having at least two epoxy groups, and (2) a solution of a carboxy copolymer formed from thirty to eighty five parts by weight of (*a*) an alkyl ester of a monounsaturated monocarboxylic acid wherein the alkyl group has not over ten carbon atoms and wherein the monocarboxylic acid is selected from the group consisting of acrylic acid and methacrylic acid, and fifteen to seventy parts by weight, the total being one hundred, of (*b*) an acid ester of a butenedioic acid and a saturated monohydric alcohol of not over twelve carbon atoms, said alcohol containing only carbon, hydrogen and oxygen and being free of oxygen-containing groups other than ether and hydroxyl groups, the ratio of (1) to (2) being 0.7 to 2 epoxide equivalents polyepoxide per carboxy equivalent copolymer, considering an epoxide equivalent polyepoxide as the weight of polyepoxide in grams per epoxide group.

TECHNICAL Bulletins

SPRAY PAINTING

New brochure is available on air operated automatic reciprocating type spray painting machines for spraying areas of the smallest products up to 12 inches wide and 40 inches long.

Conforming Matrix Corp., Dept. PVP, 402 Toledo Factories Building, Toledo 2, Ohio.

MASONRY WATER REPELLENTS

New, eight-page illustrated booklet showing where to use and how to achieve the maximum protection with silicone masonry water repellents is available.

The new publication, designated CDS-240, discusses the common types of masonry damage including efflorescence, staining, spalling and interior paint damage and their causes and illustrates how the newly-developed, highly-improved, silicone masonry water repellents act to prevent them. Descriptions of benefits and suggested uses of silicone masonry water repellents make this publication ideally suited as a sales aid for builders and maintenance contractors, building supply firms and other distributors of masonry water repellents.

Included also is an outline of the proper methods of surface preparation of masonry as well as text and illustrations showing how to apply silicone water repellent materials.

General Electric Co., Dept. PVP, Waterford, N. Y.

WET GROUND MICA

New Technical Bulletin, No. 42, "The Use of Platy Wet Ground Mica in Paints Based on Water Soluble Resins, Part II", reports recent research findings indicating that wet ground mica added to the formulation of water soluble resin paints considerably increases the vapor resistance of the paint films. In addition, the tests show that there is increased resistance to permeation by solvents such as xyol.

Reasons attributed for this improvement are the platy, uniformly delaminated wet ground mica particle and its purification in the water grinding process whereby impurities are removed.

West Ground Mica Assn., Inc., Dept. PVP, 420 Lexington Ave., New York 17, N. Y.

FOAM CONTROL

The ABC's of fast, efficient foam control are presented in a new comprehensive booklet on silicone antifoamers.

This handy manual tells where and how silicones actually reduce processing time and maintenance costs. . .increase production capacity and efficiency. It also lists the silicone defoamers permissiblein foods under the Federal Food, Drug and Cosmetic Act as amended by the Food Additives Amendment of 1958.

A working guide to effective and economical foam control in virtually every industry. . .chemical, food, pharmaceutical, petroleum, asphalt, paper, textiles, metalworking. . . this reference piece is available to all who encounter foam problems or seek to prevent foam before it develops.

Dow Corning Corp., Dept. PVP, Midland, Mich.

POLYVINYLIDENE CHLORIDE

Technical data on polyvinylidene chloride latex, "Resyn 3600", has been compiled into a special booklet which is now available.

The booklet supplies all key information necessary for evaluation by laboratory and production personnel. Resyn 3600 is an aqueous dispersion of vinylidene chloride copolymer. Because of its outstanding combination of barrier and application properties, the new product initially will find wide usage as a protective coating for packaging materials, the firm said. However, a variety of applications are also feasible in the textile, construction, paper, agricultural, and other industries and are listed in the booklet.

National Starch and Chemical Corp., Dept. PVP, 750 Third Ave., New York 17, N. Y.

BENZOYL PEROXIDE

Newest in the series of safety data sheets, SD-81, Benzoyl Peroxide, has been published by the Manufacturing Chemists' Assn.

Benzoyl peroxide is a white granular solid used largely as a catalyst in resin manufacture. Classified by Interstate Commerce Commission as an oxidizing material, it is highly flammable and will decompose explosively when heated in a confined space.

The new MCA safety data sheet covers properties, hazards, engineering control of hazards, employee safety, fire fighting, handling and storage, and waste disposal.

Copies of SD-81 are available at 30 cents each from the Manufacturing Chemists' Assn., Dept. PVP, 1825 Connecticut Ave., N. W., Washington 9, D. C.

ACETONE

New, twelve-page technical booklet about acetone is now available.

Produced by the firm's cumene oxidation process at Gibbstown, N. J., the purity of the acetone is comparable to or exceeds that of acetone produced by other processes. The booklet also points out that the company's acetone meets the physical and chemical requirements of the most rigid specifications set by various standardizing and government agencies.

Information in the booklet includes data on specifications and typical analysis; miscellaneous specifications; sales information; properties and chemistry; and a partial list of uses for acetone.

The section on chemistry includes a few of the specific and general types of reactions which acetone is capable of undergoing.

Hercules Powder Co., Dept. PVP, Wilmington 99, Dela.

MAGNET WIRES

New technical bulletin, "Varnish for Use with Poly-Thermaleze and Similar Magnet Wires" has been issued.

The new 4-page bulletin presents data showing the results obtained with "Isonel 31, the varnish found effective for use with these new types of wire in an evaluation program conducted in the company's Electrical Testing and Development Laboratory. Included is a graph on thermal life indicating Class F, B or A capability.

Schenectady Varnish Co., Inc., Dept. PVP, Sechenectady 1, N. Y.

DRUM HANDLING

New 4-page brochure describes the cost and time saving advantages of the new "Grip-O-Matic" fibre and steel drum handling attachment for fork lift trucks. Mounted on the forks, or carriage, or slipped on the lip of a shovel, the product grips drums with closed or open tops, whether drums are new or battered. The heavier the load, the tighter the grip.

Little Giant Products, Inc., Dept. PVP, 1597 N. E. Adams St., Peoria, Ill.

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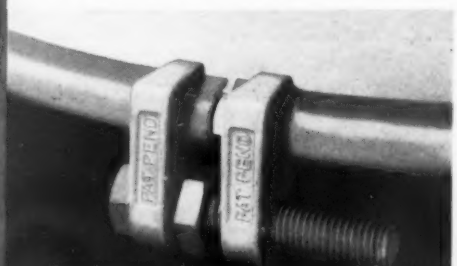

One feature of Inland drop test-defying construction is this super-strong locking ring. Special forged steel lugs** support entire profile periphery rather than just a portion of it . . . locking ring does not fail under impact, package remains intact.

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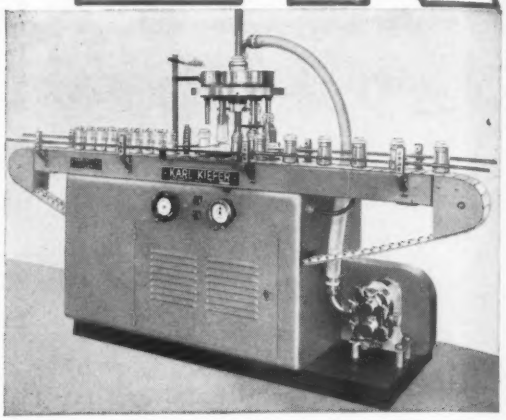

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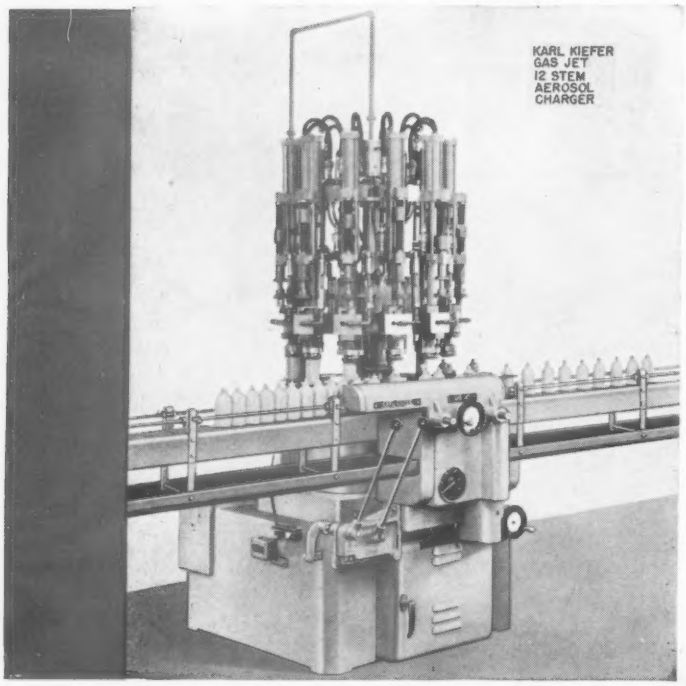

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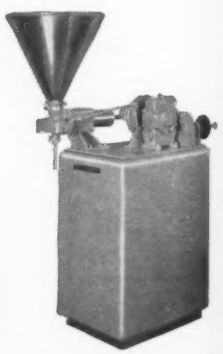

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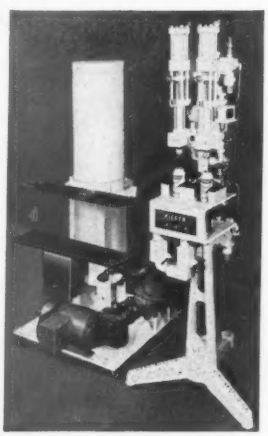

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TESTING OF AEROSOL PRODUCTS

PART I

- *Vapor Pressure*
- *Solids Content*
- *Volatile Content*
- *Flammability*
- *Combustibility*

By
Dr. John J. Sciarra*

AEROSOLS or pressurized products are rapidly being developed and their use extending into many areas. This method of application has been readily accepted by the consumer since it afforded the means of performing many tasks easier, with greater economy and convenience, and in certain cases, led to entirely new products. Aerosol paints, varnishes, paint removers, etc., certainly are no exception since they have been readily accepted by the consumer. With such products, it has been possible for the unskilled worker (housewife and other "do-it-yourselfers") to perform many paint jobs ending in professiona-results plus the ease and convenil ence of using a spray rather than a brush to accomplish the task. The success obtained with this type of product led to extended uses for aerosol paint and related products.

Of extreme importance in the development of new products and in order to maintain quality and insure the performance of existing products, adequate tests and investigations should be conducted. These tests range from a simple determination of the vapor pressure within the container to a determination of the viscosity and other physical properties of the product not only when under pressure but when released for use. The extent of the testing program is dependant upon the complexity of the aerosol product. Some of the commonly used procedures will be reviewed in this article. These tests and procedures include:

1. Determination of Vapor
2. Determination of Solids Content of Aerosol Coatings
3. Determination of Volatile-Non-Volatile Content of Aerosols
4. Flammability and Combustibility
5. Moisture Determination
6. Analysis of Propellant Mixtures

Determination of Vapor Pressure

The vapor pressure within the aerosol container is important from many stand points. Vapor pressure will control, to a certain extent, the spraying characteristics of the product. Excessive pressure may produce an extremely fine spray pattern consisting of finely dispersed particles while a low pressure may produce a stream of product. Neither result is desired if the product is designed to coat a surface with a film of paint, lacquer, or varnish. In addition the Interstate Commerce Commission places limits on the vapor pressure of aerosol products shipped in interstate commerce.

This pressure can be accurately determined through use of a special "can piercing pressure measuring device" which is commercially available. After standardizing the gage the test can is placed in the apparatus and pierced. Then the entire apparatus and test can is immersed into a water bath at 130°F. and held at this temperature for 30-60 minutes depending upon the size of the container. The contents of the can is shaken several times during this heating period and then the gage is prepressurized with an inert gas to within 5 pounds per square inch (p.s.i.) of the estimated pressure. The gage is prepressurized so as to decrease any error due to the volume of gas in the apparatus. The valve controlling pressure in the can is opened slightly and the needle on the gage observed. Depending upon the movement of the needle, the prepressurizing procedure is repeated by increasing or decreasing the prepressurizing pressure .2 p.s.i. Then the procedure is repeated until there is little or no movement of the needle. Then the valve is completely opened and the reading recorded. Three cans of product are tested in this manner and the average reading taken as the final pressure.

Solids Content of Aerosol Coatings

Knowledge of the solids content of an aerosol coating can be useful information for predicting the performance of the product. High solids coatings generally give greater coverage to the surface being coated. Experiments have indicated that good results can be obtained with a minimum of technique and equipment using a method suggested and developed by the Chemical Specialties Manufacturers Association (C.S.M.A.). This method utilizes a flexible aluminum foil, flat bottomed dish, which is accurately weighed. The aerosol container is thoroughly agitated and weighed. Both the aluminum dish and aerosol product are kept at 0°C. for 2 hours prior to the test. Then about 10 grams of the aerosol sample is sprayed onto the aluminum dish from a distance of about 6-8 inches. When

*Associate Professor of Pharmaceutical Chemistry, St. John's University, College of Pharmacy, Jamaica, 32, New York.

$$\frac{\text{Weight of residue in aluminum dish}}{\text{Loss in weight of aerosol dispenser}} \times 100 = \%\ \text{Total Solids}$$

Equation I

$$\frac{\text{Weight of residue in flask}}{\text{total weight of sample}} \times 100 = \%\ \text{non-volatile content}$$

Equation II

the aerosol can has attained room temperature it is reweighed. The aluminum foil is placed in an oven at 120°C for 3 hours and then weighed. The solids content is calculated by Equation I.

The results are compared with a standard C.S.M.A. Lacquer which has a calculated total solids content of 10.5% by weight.

Volatile-Non-Volatile Content

There are two methods suggested by the C.S.M.A. for this determination. The "Densimetric Method" is used primarily for those aerosol formulations not containing solids at low temperatures or that do not have volatile active ingredients which would interfere with the vacuum distillation method. While the "Vacuum Distillation Method" was designed primarily for use with aerosol insecticides and room deodorant formulations not containing methylene chloride or other volatile active ingredients, its use has been extended with success to those products containing suspended solids.

Densimetric Method

This method makes use of a hydrometer which is used to measure the density at a specific temperature. In order to minimize loss of volatile components, a temperature of −20°F is generally used. This is accomplished by immersing a sample of the test aerosol contained in a cylinder (previously chilled to −20°F) in a bath of dichlorodifluoromethane (Propellant 12). The hydrometer is immersed into the aerosol sample and read. In order to determine the composition from this data, a minimum of two known samples, one containing about 1% more volatile material and the other containing about 1% less than the required amount are tested in a similar manner and their densities determined. By plotting this information on a graph and determining the slope of the line(K) the composition of the unknown may be determined from the following:

$$K(\text{Density}_{-\text{standard}} - \text{Density}_{-\text{test sample}}) + \%_{-\text{standard}} = \%_{-\text{test sample}}$$

A more convenient method would make use of a standard table or graph worked out for different densities.

Vacuum Distillation Method

This method utilizes the percentage weight loss of a sample held under moderate vacuum and ambient temperatures as its basis. A sample of about 50 grams of aerosol product is introduced into a a tared vacuum flask and weighed. This flask is then placed into a water bath at 120°F and the propellant is allowed to evaporate through a side arm in the flask. Vacuum is then applied periodically and finally the flask is reweighed. Correct technique is obtained by repeating the test using a product of known non-volatile content. Percent non-volatile can then be obtained from the following relationship given in Equation II.

In this procedure it is important that adequate vacuum be maintained so as to obtain correct results. Placing a gauge in the vacuum line will aid in obtaining accurate results.

Flammability and Combustibility

While the propellants used in the formulation of aerosol products are essentially non-flammable, the addition of several solvents such as alcohols, ketones, etc., may confer flammability to the product. Hair sprays and perfumes containing large quantities of alcohol fall into this category. There are three tests suggested for determining flammability and combustibility of aerosol products;

The Flame Projection Test
The Modified Tag Open Cup Test
The Drum Test.

The flame test is used to determine how far a flame will extend beyond an open flame when the aerosol product is sprayed directly toward the flame. The test is carried out in a draft free area with adequate ventilation when needed. The spray is directed toward a flame and the extension of the flame is measured by means of a ruler. The average of three readings is taken as the final result. Aerosols producing a flame extension of over 8 inches are classified as combustible; over 18 inches as flammable; and those which flash back at any degree are also classified as flammable.

The modified Tagliabue Open Cup method is performed using standard equipment designed for this purpose. It indicates what might occur if the propellant leaked out and the contents boiled or evaporated excessively. The contents of the aerosol dispenser (after allowing the propellant to escape) is transferred to the Tag Open Cup. The solution is heated at the rate of 2°F per minute until the solution flashes when the Tag Gas Flame Testing Burner is applied or the volume has dropped ¼ inch from the initial starting line. The latter solutions are said to have no flash; those which flash below 100°F are flammable; and those below 300°F but over 100°F. are combustible.

The Drum Test indicates hazards, if any, that may result if one were to spray excessive quantities of different formulations in a confined space in the presence of a flame. A 55 gallon open head drum is fitted with a hinged cover over the open end, so fitted that it will open at a pressure of five pounds. The closed end is fitted with three shuttered openings for introduction of the spray. A window is provided for observing the test along with a candle located midway between the open and the closed end of the drum. The aerosol product is sprayed into the drum with the cover in the open position. Any propagation of the flame through the vapor air mixture is considered a positive result. The test is repeated with the drum in the closed position. Any explosion capable of opening or causing the hinged cover to move is considered a positive result.

Part II, scheduled for the November issue, will discuss moisture determination and analysis of propellants.

Aerosol Developments

Push Button Decorating Publicity on Aerosols

On Pages 46 through 49, and page 80 of the August issue of *American Home*, appears a feature, "Push Button Decorating", the latest result of your publicity and market development program.

While this story deals with aerosol paints and protective coatings, and will undoubtedly encourage millions of homemakers to buy and use such products for prettying up their rooms, furniture and accessories, it will also make them more aware of the advantages of many other push-button products.

The idea for this feature article was first suggested to the editors of *American Home* in December, 1959. In repeated meetings with the magazine's editors and researchers, the theme was developed for the story.

Elgin Introduces Non-Stop Four Cylinder Filler

Elgin Manufacturing Co., Elgin, Ill., announced the addition to its non-stop piston filler line of a four cylinder model expressly for high production needs.

According to company spokesmen, the use of four cylinders now makes available a simple-to-operate machine which allows easy container or product change-over. The new non-stop handles high speed filling of any liquid or semi-liquid into glass, tin, aluminum, or polyethylene containers.

The new design also completely eliminates the spill which occurs in interrupted starting or stopping of containers. Products are conveyed continuously with filling heads moving smoothly with containers during the filling cycle. Once the cycle is completed the heads return automatically to the next four containers in the line.

The machine can be equipped with cylinders and pistons for consistently accurate filling on any size container up to and including quart sizes. It has already been adapted for double as well as single line containers and as a two head unit for gallon filling.

Other features of the new Non-Stop Filler include: simplified cleaning; contact parts of nickel alloy, or stainless steel; and a manifold feed, which can be substituted for reservoir. An agitator can be inserted in the reservoir if desired.

Plastic-Kote Publishes New Aerosol Paint Catalog

New multi-color eight-page aerosol spray paint catalog has just been published by Plasti-Kote, Inc., Cleveland, Ohio. The new catalog is said to be one of the most complete ever to be offered in the aerosol paint industry.

Each page features full color illustrations of push button spray paint products. Products for use in the home, for automobile and boat, on the farm and in industry are presented in complete detail. This includes information on operating features, color selections and as-

sortment numbers. Special pages are devoted to fast drying lacquers, plastic sprays, hammer finish sprays and specialized sprays. Special spray products include rust solvent, Ignition spray, degreaser and motor cleaner, insect spray, floral sprays and many others.

The firm's extensive selection of point-of-sale floor and counter displays for aerosol paints are also illustrated in the catalog.

New String Tag Added to Aerosol Paint Can

Illinois Bronze Powder Co. has added an attractive new string tag to every can of "Spray-O-Namel" brushless spray paint. The black and bronze folded tag is designed to give added point-of-purchase and impulse value to the can. While all the instructions for use of Spray-O-Namel are on the can label, the new tag points up the advantages and properties of the paint itself.

The manufacturers of the paint feel that the attached string tag is easier to read, adds appeal and will draw a great deal of interest to the product.

New string tag adds impulse value to "Spray-O-Namel" Can.

Spray-O-Namel is a quick-drying, non-toxic enamel paint in an aerosol can for easy application. The Illinois company has recently developed a new rust inhibitor, "Rustcor," which is incorporated in Spray-O-Namel. Since it penetrates rust and bonds tightly to a rusted surface, it is practical for outdoor use as well as indoor, the firm says.

A glowing addition to the holiday decorating shelf of every hardware and paint store is the new Christmas Color Spray from Illinois Bronze. The new spray, in an aerosol can, is perfect for giving decorations a brilliant glitter.

This new Christmas Color Spray is perfect for decorating door wreaths, mantel decorations, ribbon, greeting cards, gift wrap, tree bases, branches and "Styrofoam". It is available in Red, Green, Silver, Gold and White.

Dressed in an eye-catching label of gleaming foil, the can makes a bright shelf display. Because this new color spray is also practical for everyday household painting jobs, the firm has devised a label which allows the dealer to maintain a year-round stock of Color Spray. After the Christmas season, he can simply tear off the perforated section of the label and it becomes a year-round Color Spray can.

LAKOKRASOCHNYE MATERIALY I IKH PRIMENENIE

Polyurethane Lacquers for Manufacture of Lacquer-Glass Fabrics.

T. L. Karina, K. A. Andrianov, and N. N. Srdsolov. Lakokrasochnye Materialy i Ikh Primenenie, 1 (1960), No. 2, 1-5.

The paper reports on the synthesis and investigation of polyurethane lacquers used in treatment of glass fabrics; both organic polyurethanes, and polyurethanes modified with organosilicone monomers were studied. The use of "latent" diisocyanates (i.e., diisocyanates chemically inert at room temperatures but reactive at temperatures of 125-140°C), in a reaction with polyolefins, permits the preparation of stable polyurethane lacquers. Investigation of the mechanical and dielectric properties of these polyurethane lacquer films shows them to be considerably superior. The authors also prepared glass lacquer fabrics, based on the polyurethane lacquer, and studied their properties both in the initial stages, and after extended action of humidity and thermo-aging. In many instances, polyurethane lacquer-glass fabrics show better characteristics than other similar materials manufactured currently; they possess high elastic properties, the dielectric properties decrease insignificantly with thermo-aging, they are stable to the action of fats, etc. Those fabrics modified with organosilicone monomers show the highest stability to humidity. The authors recommend these fabrics for use as insulators to be used at temperatures of 120-130°C, and possibly at 150°C.

New Lacquer-Paint Materials Produced by Soviet Plants.

Lakokrasochnye Materialy i Ikh Primenenie, 1 (1960), 85-87.

Brief notes, describing the composition, characteristics and uses of new Soviet products: water-soluble emulsion polyvunylacetate paints PVA; water-soluble paints based on styrene-butadiene latex; epoxy enamels EP-91 and EP-91A; black oil-phenolic primer FL-014; yellow and red epoxy primers EP-09T; epoxy enamels EP-74T; alkyd-styrene enamel MS-17; pore-filler KF-1; furniture nitrolacquer NTS-27; growth-retarding per-chlorovinyl paint KHV-53; ethylcellulose filler; phosphatizing primer VL-08; perchlorovinyl enamels KHV-113; alkyd-urea enamel (black) for automobile painting; synthetic alkyd-urea automobile enamels; reflex synthetic automobile enamels; electro-insulating lacquer No. 124; polyurethane lacquers UL-1 and UL-2; furniture polyester lacquer PE-7-4; ski lacquer MCh-52; parquet lacquer Mch-26; molybdenum chromate.

A Magnetic Device for Measuring Film Thickness.

Timokhov, E. P. Lakokrasochnye Materialy i Ikh Primenenie, 1 (1960), 65-66.

A description of APT-1, a new device for measuring the film thickness of lacquers and other non-magnetic materials such as lead, chrome and other films. Based on a model designed by the Czechoslovak enterprise "Kovofinis", the device is manufactured by a Khot'kov plant. Fundamentally, it is a dynamometric system provided with a permanent magnet, capable of determining film thickness in 10-500μ limits, with a $\pm 10\%$ accuracy.

Reactions of Carboxyl-Containing Binders with Pigments in Thin Films.

Frost, A. M., and Blagonravova, A. A. Lakokrasochnye Materialy i Ikh Primenenie, 1 (1960), 32-38.

An investigation deals with conversion a copolymer of styrene and maleic anhydride, esterified by butyl alcohol, into a three-dimensional polymer, by the reaction of the carboxyl

groups with ZnO. The salt-formation proceeds more intensively with a large excess of ZnO. When orthophosphoric acid is added to the system copolymer-ZnO, it reacts with the copolymer salt, shifting the reaction equilibrium toward the formation of Zn phosphate. When the copolymer-ZnO-H_3PO_4 system is applied to a steel plate, H_3PO_4 combines with steel thus shifting the equilibrium toward the formation of a salt with a three dimensional structure. The described characteristics of the salt-formation process were utilized in preparing primers whose basic properties were found to equal or exceed the properties of polyvinylbutyral-phosphatizing primers.

Polyester Lacquers for Furniture
Maksimova, V. G., and Moiseeva, N. A. Lakokrasochnye Materialy i Ikh Primenenie, 1960, 2:27-30.

The described furniture-finishing processes were developed cooperatively by several Soviet research bureaus and furniture plants. Preliminary treatment of the wooden surfaces, which should not contain over 12% moisture, consists of a coat of an insulating primer based on polyurethane resins. Double-jet sprayers, recommended for the lacquering, combine the lacquer components at the time of application, thus avoiding gelatinization of the mixture. Other type of application equipment, devised in the USSR, is similar to the Swiss Steinemann equipment. Spraying in electrostatic field is recommended for finishing of complicated surfaces. The paper briefly describes the optimum conditions of furniture lacquering. Drying temperatures should remain within the 18-25°C limits, at a humidity not exceeding 60%; drying time of 3-4 hours at 18-25°C, followed by 35-40 minutes in a thermoradiation unit, is recommended. Bufling and polishing completes the finishing process. Experimental work in furniture lacquering by polyester lacquers indicates that 1) one coat of a polyester lacquer gives the surface a satisfactory appearance even without a preceding priming treatment, as well as a high gloss; 2) depending on the nature of the surface, the optimum thickness of the polished coat is between 250 and 450 −; 3) the Soviet-made PE-7-4 polyester lacquer dries fully in ten hours; 4) again depending on the type of wood, the covering power of this lacquer is 500-900 g/m- (or 650-1100 g/m- when sprayed); 5) the coating shows satisfactory water, light, heat and frost stability.

Properties of Cellulose Nitrate Films Modified With Organosilicon Compounds.
Andreev, P. A., Kreshkov, A. P., Guretskii, I. Ya., and Malakhov, R. A. Lakokrasochnye Materialy i Ikh Primenenie, 1 (1960), 13-17.

A new method of preparing Si-nitrocellulose products is described; it is based on a reaction of cellulose nitrate organosilicon compounds. The described method requires no complex apparatus, and may be successfully employed in the paint and lacquer industry. The modification of nitrocellulose lacquer solutions with organosilicon compounds resulted in the improvement of some physico-technological properties of nitrocellulose films; the authors predict that Si-nitrocellulose materials may find wide application in various branches of the paints industry as film-forming substances.

***1960* Standardization Plans**
Livshits, M. L. Lakokrasochnye Materialy i Ikh Primenenie, 1960, 2:79-80.

A brief review of the standards and norms included in the Soviet 1960 standardization plan. Synthetic enamels for automobiles, epoxy enamels, pigments, paints and lacquer materials and finished products, perchlorovinyl enamels, and methods of investigation are among those described. A list of new standards appears on p. 81.

Flow-Coating Equipment (Review of Foriegn Literature).
Vetukhnovskii, Z. B., Darazhio, G. N., and Rakhlina, A. V. Lakokrasochnye Materialy i Ikh Primenenie, 1960, 2°81-88.

A review paper, summarizing the developments in flow coating equipment during the past few years in the United States, Canada, and Europe.

ABSTRACTS

The following are abstracts of papers presented at the September 11-16 meeting of the American Chemical Society, Division of Organic Coatings and Plastics Chemistry in New York City, N. Y.

Flow Properties of High Molecular Weight Materials

By A. E. Judkins and F. F. Carini, General Electric Co., Schenectady, N. Y.

The initial adherence of particles to a metallic substrate is promoted by the electrostatic charge induced or present in the material which is fluidized. At elevated temperatures the particles fuse and flow to cover the object to be coated.

The flow properties are effected by the viscosity and surface tension of the thermoplastic materials. The materials studied in this investigation were polystyrene, lexan, and an epoxy resin. The viscosity and surface tension were measured as a function of temperature and the effect of an imposed electrical field was determined. Some comments on the interfacial tension between the melts and solid surfaces will be made. The relationship between coatability and the flow properties of organic materials are discussed.

In this investigation a modified parallel plate plastometer was used to measure the viscosity of thermoplastic materials at elevated temperatures. The effect of an electrical field on viscosity was measured by the application of a field between the two plates.

The surface tension of the melt was determined at elevated temperatures and as a function of an imposed electrical field. The pendant drop method and the sessile drop method were utilized in determining surface tensions.

Process Parameters in Fluidized Bed Coating

By J. Gaynor, A. H. Robinson, E. E. Stone, and M. Allen, General Electric Co., Schenectady, N. Y.

The importance of quantitative knowledge of the effects of process parameters on coating speed and thickness, if this method is to fit in with high speed manufacturing techniques, is discussed. This report deals with the results obtained using the hot part technique for coating and for one resin only—EPON 1004.

The experimental equipment in which experiments were performed is described. The effects of particle size, gas velocity, fluidization uniformity, bed density, immersion temperature, and immersion time on coating rate, coating thickness, and coating uniformity are described and discussed. Quantitative relations are derived for coating rate and coating thickness as a function of particle size, gas velocity, bed density, immersion temperature, and immersion time. These relations are used to interpret the effects of fluidization behavior on the application of coatings.

Flexible Polyester/Liquid Epoxy Resin Condensate

By John Wynstra, Union Carbide Plastics Co., Bound Brook, N. J.

Carboxyl-terminated aliphatic polyesters can be cured with liquid glycidyl ether resins (such as Bakelite ERL-2774) under conditions of base catalysis to yield condensates which may be made to range from tough elastomeric to art gum-like compositions. The physical properties of these condensates suggest utility in potting and encapsulating applications.

Because even one set of polyester raw materials can be used to make a wide variety of polyester compositions, an empirical evaluation of polyester/epoxy resin condensates could be rather time-consuming. To supply some rationale to such an evaluation program, some mathematical formulas were derived which permit the calculation of number average degrees of polymerization and carboxyl functionalities of polyester compositions. The latter, in particular, were found very useful in predicting and correlating performance with composition.

Illustration of this use is furnished in the case of polyesters derived from adipic acid, diethylene glycol, and glycerol; of particular interest from the standpoint of economics are some similar polyesters based on dimerized soya acids.

Coatings Based on Acrylamide Interpolymers

By H. A. Vogel and H. G. Bittle, Pittsburgh Plate Glass Co., Springdale, Pa.

The formulation and properties of several coatings prepared from acrylamide interpolymer resins are discussed.

A large variety of available reactive monomers can be used in these resins, hence chemical control of end-properties of coatings can be practiced. Resin compositions useful for appliance finishing are given, along with tabulation of enamel properties of these thermoset acrylic finishes compared with alkyd-melamine enamels. An example showing the use of a more flexible composition suitable for roll-coating followed by fabrication as in strip-coating metal is also included.

The uses of other resins or modifying plasticizers, including epoxy and vinyl resins as well as epoxidized oils, is illustrated.

It is pointed out that optimum properties of DURACRON (Pittsburgh Plate Glass Co. registered trademark for thermosetting acrylic resin coatings) enamels are developed at baking temperatures of 300° to 350°F. These coatings can be catalyzed by use of acidic catalysts, including phosphoric and citric acids. Another means of promoting the cross-linked cure is by internal modification of the acrylamide interpolymer with an unsaturated acid. Examples comparing cured enamel properties of uncatalyzed, phosphoric acid-catalyzed, and internally catalyzed types are given.

Finishes based upon acrylamide interpolymer resins can be pigmented with conventional techniques and can be applied industrially using air spray, electrostatic spray, dip, flow-coat, roll-coat, curtain coat, or other normally used equipment. Solvents for these coatings or the resins themselves can be varied to be most suitable for the application conditions. The most general solvents include toluol, xylol, aromatic naphthas, and butanol.

Effect of Catalytic Aging Reactions On Mechanical and Solubility Properties of Films Derived from Neopentyl Adipate Polyesters and Toldene Disocyanate

By Bernard F. Cinadr and Edward G. Bobalek, Department of Chemistry and Chemical Engineering, Case Institute of Technology, Cleveland 6, Ohio.

Although the necessary conditions are known for formation of tough films from polyurethane intermediates, the chemistry is too complex to allow certain predictions of how variances in the polymerization process effect molecular structure and polymer properties. This research was undertaken in the hope that a correlated study of solubility and mechanical behaviors might show the effect of different catalysts and environments on cross linking or other structural features which can modify film quality.

Films (0.01-inch thick) were cast on mercury of intermediates derived from reaction in solvent of 2 moles of diisocyanate per mole of hydroxyl terminated polyesters, using catalysts like *n*-methylmorpholine, methydiethanolamine, and cobalt and/or lead ions to promote film-forming reactions. The films, when dry, were aged at different levels of temperature and humidity. The solubility behavior was rated by measuring swelling ratios, rates of extraction, and the intrinsic viscosity of extracts. Mechanical properties were rated by measuring tensile and stress relaxation behavior. The stress induced microstructure and fracture process were observed microscopically in a few typical specimens.

The data support the theory that hydrogen bonding provides a strong cross-linking mechanism which dominates even the effects of moderate covalent cross linking. Polymers derived from the same intermediates show very similar mechanical properties even though significant differences in solubility properties suggest variances in other details of molecular structure.

A Critical Examination of the Use of Gas Chromatography for the Qualitative Determination of Oil Content in Organic Coatings

By Walter L. Zielinski, Jr., William V. Moseley, Jr., and Richard C. Bricker, Paint Department, Virginia Department of Agriculture and Immigration, Richmond 19, Va.

The Paint Industry has had a good deal of interest in the area of drying and semi-drying oils and in their role played in the formulation of organic coatings. Gas chromatography is found to offer a simple and rapid means of oil analysis of both modified and unmodified oils.

The unmodified oils of linseed, soya, tall, tung, castor, safflower, etc. are readily identified from a chromatogram tracing of their fatty acid methyl esters. Special oils, such as isomerized soybean and dehydrated castor are also readily characterized.

When oil acids are reacted via heat treatment or with certain chemicals (maleic anhydride, dicyclopentadiene, etc.), the acid polymers formed through Diels-Adler and oxidative polymerization mechanisms are not volatile at the column temperature employed—and a decrease in the area per cent of the polyunsaturated peaks obtained in gas chromatographic analysis is observed. An indication of the degree of polymer entity in the oil may be had by sequential precision injection of pure methyl esters, or alternately, by micromolecular distillation. Infrared techniques may be used in following the disappearance of oil unsaturation via polymerization, but is limited for use in oil identification.

These investigations indicate that Gas chromatography is a useful tool in the examination of oils employed in organic coatings. Its usefulness may be directed either toward process studies for following the oil composition changes in a resin cook; for use in competitor product examination; or simply for oil identification and determination of the fatty acid distribution of an oil sample.

Interreaction in the Melamine-Alkyd Resin System

By H. P. Wohnsiedler, American Cyanamid Co., Stamford, Conn.

The melamine-alkyd resin combination is basic to an important heat convertible coating system. It may be looked upon as a plasticized form of amino resin in which at the outset the plasticizer exceeds the plasticized component by a ratio of 2:1 to 4:1.

A butylated melamine-formaldehyde resin and a saturated fatty acid modified alkyd are the two components of the system under consideration. They are first described in terms of their general composition and properties. Their characteristic solubilities are used to demonstrate their interreaction during film baking in the course of which optimum properties are reached.

In order to interpret the reactions taking place, starting compositions are appraised in terms of reactive groups and group ratios. These ratios are determined analytically in films in the course of cure. The comparative changes taking place in the reactive amino resin by itself and the blend indicate that interreaction involves butoxyl as a principal group and its elimination as butanol rather than dibutyl formal.

Thermosetting Compositions Based on Acid Copolymers Cross-Linked with Diepoxides

By J. D. Murdock and G. H. Segall, Canadian Industries Ltd., Central Research Laboratory, McMasterville, Quebec, Canada.

This paper describes the research which led to the development of appliance enamels based on acidic vinyl copolymers cross-linked by means of polyepoxides in the presence of basic catalysts. Specifically, it describes the preparation of copolymers of styrene, acrylates or methacrylates and acrylic acid and discusses the effect on enamel properties of varying the composition and molecular weight of the copolymer. The properties emphasized in the development of enamels were adhesion direct to metal, good appearance, good application properties, and resistance to such things as detergents and grease. Molecular weights of useful copolymers and an intrinsic viscosity-molecular weight relationship are given.

Copolymers high in styrene or vinyltoluene content had excellent resistance to hot detergent solutions, panels having two coats of enamel being substantially unaffected after 1000 hours of immersion in a 2% solution at 80°C. Inclusion of appreciable amounts of methacrylates gave improved resistance to ultraviolet light, but lowered detergent resistance slightly, while inclusion of larger amounts of acrylates improved flexibility but reduced grease resistance. Approximately 8% of acrylic acid was found sufficient for adequate cross linking where weight average molecular weight was about 30,000. Various polyepoxides were useful, but

resinous condensation products of bisphenol and epichlorohydrin were preferred.

A method of obtaining free films of cross-linked copolymers is described and a typical stress-strain curve is given.

Microdispersed Formaldehyde-Arene Resins

By J. E. Goodrich, California Research Corp., Richmond, Calif.

Two types of resin are produced by the acid-catalyzed reaction of an aromatic compound (arene) with formaldehyde. The thermoplastic type, prepared at elevated temperatures, has been studied extensively. It is essentially oxygen free and has a softening point up to about 285°F. Numerous methods of preparation and uses have been patented.

However, the infusible oxygen-containing type of resin formed in the presence of concentrated sulfuric acid below 90°F. has received little attention. No commercial use has been found for this resin which is highly inert and insoluble.

We have found that the infusible resins can be prepared in a microdispersed state by using a dispersing agent and vigorously agitating the reaction mixture. In this way, resins of 0.1 micron particle size and surface area of 110 square meters per gram are formed. Arenes which produce these resins have the 1-, 2-, and 4-ring positions free and do not have electron withdrawing substituents. A mechanism of resin formation is proposed.

The microdispersed resins are efficient thickening agents for both organic and aqueous liquids. Numerous uses are suggested.

Studies on the Phases in Heterophase Polymer Gels of Fixed Oils and Resins

By Max Kronstein, New York University, College of Engineering, University Heights, New York 53, N. Y.

The heterophase conditions in polymerization products of polyhydroxy alcohol fatty acid esters (fixed oils) and certain resins are being studied. The fluid and the three-dimensional, swelling, insoluble phase of a dispersed linseed oil gel have been separated, and the phases are being studied individually. It has been found that the recovered fluid phase still contains some heterophase matter, as indicated by its diffraction x-ray spectrum; but, like the initial fluid phase, it is capable of polymerization into a solid state, when reacted with an organic-peroxide. The recovered solid matter is capable of increasing its volume, in contact with benzene, about 4 times, without going into a coherent state. In this swollen form the three-dimensional particles have very little coherence and can easily be separated. When the recovered solid and swelling matter are immersed in monomeric styrene, the swelling initiates a corresponding solidification of the styrene, whereby 83.5% of the monomer turns into an insoluble, incoherent form. The degree of this effect on styrene depends on the degree of swelling capacity in the exposed polymer solids.

Acrylic Coatings Cross-Linked with Amino Resins

By John C. Petropoulos, Charles Frazier, and Leonard E. Cadwell, American Cyanamid Co., Stamford, Conn.

Linear copolymers made from vinyl and acrylic monomers and varying quantities of methylolacrylamide, β-hydroxyethyl methacrylate or methacrylic acid, when blended with amino-formaldehyde resins and baked for 30 minutes at 300°F., produced hard coatings suitable as industrial finishes. The copolymers containing β-hydroxyethyl methacrylates had the best overall film properties. They approached epoxy-urea coatings in chemical resistance and were considerably better than a premium grade alkyd-amino blend in retention of color and gloss when overbaked. This latter property was found to be related to the structure of the acrylic and vinyl comonomers used in conjunction with β-hydroxyethyl methacrylate. The degree of discoloration was found to increase in the order butyl methacrylate < styrene < methylstyrene < butyl acrylate < ethylstyrene.

An attempt is made to correlate the properties of these copolymers on the basis of their chemical composition and structure.

NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

O. V. Tracy Retires

O. V. Tracy has retired as President of the Esso Standard Division, Humble Oil & Refining Co.

William W. Bryan, who has been serving in Houston as Vice President for Marketing on Humble's headquarters staff, will succeed Mr. Tracy as president of the Esso Standard Division.

In returning to Esso, Mr. Bryan will be rejoining the organization in which he began his oil-industry career. He spent 33 years in Esso's marketing operations.

Mr. Tracy, a native of Syracuse, N. Y., was graduated from the United States Naval Academy in 1924. He joined Esso Standard Oil Co., now a Humble division, in 1930, and in the following years became closely associated with petrochemicals development.

He served as president of the Enjay Company, Inc., Esso's petrochemicals marketing affiliate, from 1952 to 1958. Enjay (now the Enjay Chemical Co.) became an operating division of Humble several weeks ago.

Executives of The Empire Varnish Co. pose beneath a reproduction of the company's 50th anniversary emblem. Reading from left to right: Rear row, Walter H. Coleman, Treasurer; Linwood B. Hawkins, President; Robert L. Robison, Vice President, Sales. Bottom row, Norman E. Stafford, Vice President, Advertising; Ira Cole, Vice President; Robert L. Hawkins, Jr., Executive Vice President and Secretary.

Consolidates Operation

Standard Toch Chemicals Co., a leading paint and protective coating manufacturer, has announced it will close its plants in Staten Island, Linden, N. J., Brooklyn, and East Rutherford, N. J. in the near future, to consolidate eastern operations, in the recently purchased Congoleum-Nairn plant in Kearny, N. J. The firm's fifth plant, Standard-Toch Chemicals, Inc., of Chicago, Ill., will continue its operations in the mid-western area.

Thompson-Hayward Named Distributor by Hercules

The appointment of Thompson-Hayward Chemical Co., Kansas City, Mo., as distributor for Hercules Powder Co.'s "Pamak" tall oil fatty acids in most of the mid-continent area, was announced.

Thompson-Hayward will act as distributor for Pamak in all mid-continent states, with the exception of Wisconsin and Michigan and parts of Illinois and Indiana, where the distribution of these products is handled by Arthur C. Trask Co., Chicago, Ill.

The Pamak tall oil fatty acids are produced by the Paper Makers Chemical Department of Hercules, and are used in a variety of industries including protective coating, soap and disinfectant.

NEWS

United Lacquer Mfg. Corp. Announces Expansion Program

United Lacquer Mfg. Corp., Linden, N. J., has announced plans for the further expansion of production and warehouse facilities at the Linden manufacturing plant. Increased demand for its many industrial and specialty finishes, private label packaging, and its newly introduced line of consumer paints has warranted the centralizing of all phases of the firm's activities.

Cal Ink Sets Up New Purchasing Office

A new purchasing office has just been set up by the California Ink Co., Inc., in the firm's main plant in, Berkeley, Calif.

John Tadson, Purchasing Agent, is in charge of the new office. He is responsible for handling the purchasing of all materials used by the Berkeley plant and the Research & Development Laboratories.

Cal Ink's Berkeley operation covers four square blocks and annually produces about $10,000,000 of printing inks, paint colorants and vehicles, and printing rollers. The firm has nine other manufacturing facilities in the west.

Unusual Research Park Open for Scientists

The only research park in the United States established under a specially created SRD (science, research, development) zoning classification was officially opened this month. Palos Verdes Research Park, near Los Angeles, Calif., was created to help corporations (1) hold key creative technical personnel by providing them a stimulating environment in ideal living surroundings, and (2) carry out basic and applied research and development activities under productive conditions.

Located on scenic Palos Verdes Peninsula adjacent to Los Angeles, Palos Verdes Research Park was conceived by Great Lakes Carbon Corp., which commissioned Stanford Research Institute to analyze over 200 land development parks and to establish the proper criteria for an ideal research center.

Fats and Oils Discussions To Highlight Convention

The increasingly wide range of chemicals derived from natural fats and oils is reflected in the program of the American Oil Chemists' Society, planned for the Hotel New Yorker, October 17—19. Research leading to more use of fat-based products is vitally important in reducing agricultural surpluses in this field. U. S. trends will be highlighted by Morris W. Sills, agricultural economist for the U. S. Department of Agriculture. The world-wide situation will be covered in a report by Dr. Foster Dee Snell, American representative on the International Fat and Oil Commission of the International Union of Pure and Applied Chemistry.

A three-day program involving more than fifty technical papers has been announced by Dr. Waldo C. Ault, program chairman, of the Eastern Regional Research Laboratory, U. S. Department of Agriculture, Phila., Pa. Nutritional aspects of fat chemistry, new analytical methods and processing operations will be covered. New developments in the use of fat-derived chemicals in detergents, paints, plasticizers are also on the program. An attendance of about eight hundred is expected according to D. S. Bolley of the Baker Castor Oil Co., the General Chairman.

NEWS

Reichhold Expands

Reichhold Chemicals, Inc. plans to expand its Jacksonville, Fla., facilities to include a ten-million pounds-per-year combination unit for the production of polyester and alkyd resins.

The new unit will serve to make polyester and alkyd resins more readily available to the rapidly growing industries in the southeast portion of the United States.

Also planned in connection with the new unit will be additional laboratory space to accommodate the increased personnel required to handle service problems of the additional new customers of the Jacksonville facilities.

To be built at the cost of approximately a half-million dollars, the unit will include the sixth polyester facility to have been added by Reichhold during the past five years. The two most recent, completed this past year, are at its Tacoma, Wash. and Houston, Tex. plants. Others are located at Detroit, Mich.; Elizabeth, N. Y.; and Azusa, Calif.

Enjay to Expand

Enjay Chemical Co., a division of Humble Oil & Refining Co., announced expansion plans for the Baytown, Tex. orthoxylene plant.

The plant capacity will be increased from 44 to 72 million pounds per year by the end of 1960. Capicity can readily be expanded to 165 million pounds per year if demand increased sufficiently.

With the shortage of naphthalene in recent months, the firm pointed out, many domestic and foreign phthalic anhydride producers have turned to orthoxylene to supplement their raw-material supply.

According to the firm, it believes it can continue to sell orthoxylene in the sizeable and growing phthalic anhydride market at prices that will compete with naphthalene.

The firm said the stability and dependability of supply provides an incentive for both domestic and foreign phthalic anhydride producers to convert to orthoxylene.

Training Conference Emphasizes Customer Service

Service to the customer was the theme of a 3-day technical training conference recently held in Princeton, N. J., by Minerals & Chemicals Philipp Corp. for its nation-wide distributor organization. Established as an annual training school by MCP's Distributor Department, the conference serves to ground its distributors on the technical phases of the company's products, bring them up to date on what is being developed in the research laboratories, and call their attention to how its products are currently being applied in the field.

Selecting this year's conference theme from the firm's basic sales philosophy of "Marketing Through Service," O. E. Hempel, Manager of the Distributor Department, explained to representatives of its more than 50 distributors that emphasis in its marketing is placed on meeting the customer's needs rather than on merely selling the company's products. The firm for years has had a sales program designed to stress the quality, performance, service, and integrity of both its products and the organization behind them, he added, and as a result its distributors had been carefully selected for their sales-service ability in order to carry out such a program.

NEWS

Dewey & Almy Awarded Advertising Certificate

The Dewey & Almy Chemical Division of W. R. Grace & Co., Cambridge, Mass., was awarded a certificate of merit by the Advertising Specialty National Assn. for outstanding use of advertising specialties in business promotion.

The award was made at ASNA's general membership dinner during the 57th annual convention in the Palmer House. The certificate was in Category I (budgets of less than $1,000) of ASNA's third annual competition.

In the promotion, Dewey & Almy used a replica of a stop sign to boost interest in a new campaign. Objective was to induce paint manufacturers to buy the company's products, then follow through in a full promotional program of other Dewey & Almy products.

Washburn Completes Lab

The T. F. Washburn Co. has announced the completion of a new technical service laboratory to specifically handle customer service and supplement the newly expanded solvent laboratory as well as the newly completed polymer laboratory.

The laboratory is under the direction of Raymond B. LuBien, technical service director with Juris A. Zusevics, formerly with the Central Research Laboratory of DeSoto Chemicals heading up the solvent-thinned section. William Camp, who recently joined Washburn from Standard Ultra Marine in Huntington, West Virginia heads up the water-thinned coatings section.

Witco Acquires Sonneborn

Witco Chemical Co., Inc., has acquired 100 per cent interest in privately owned Sonneborn Chemical and Refining Corp. and its subsidiaries in exchange for 300,000 shares of Witco stock.

Also reported in the announcement was the election to Witco's board of directors of three Sonneborn officials—namely, R. G. Sonneborn; Gustave Schindler, Vice President; and Dr. Henry Sonneborn III, Vice President and Secretary. In addition, Mr. Schindler and Dr. Sonneborn have joined Witco's executive committee.

Charles M. Lemperly Dies

Charles M. Lemperly, an executive of the Sherwin-Williams Co. until his retirement in 1953, died at his home in suburban Rocky River, Ohio. He was 72.

Mr. Lemperly, who joined Sherwin-Williams in 1907, was for many years Advertising Manager. In 1943 he was named a Vice President and Director of Sales. Two years later he was elected to the Board of Directors. In 1952 he was appointed Director of Public Relations. He retired from the Board of Directors in 1956.

During his business career Mr. Lemperly was a director of the National Screw and Manufacturing Co. and was active in the National Paint, Varnish and Lacquer Assn.

Huber Names Freeman

R. T. Freeman Co. has been named by J. M. Huber Corp. as exclusive distributor for its series of "Huber" kaolin clay extender and Zeolex synthetic silica pigments to the paint and varnish industry in the New England states, excepting southern Connecticut.

NEWS

DeVilbiss Establishes Technical Training Center

Establishment of a technical training center and customer research laboratory in the Barrie, Ontario, plant of DeVilbiss (Canada) Ltd. has been announced.

The company, a subsidiary of The DeVilbiss Co., Toledo, Ohio, is now able to conduct most of the tests involved in solving customer finishing problems which previously have been handled at the Toledo plant.

It also will have a training school offering courses in industrial product finishing, maintenance painting, general refinishing, service training, automotive finishing, and use of portable equipment.

L. H. Schroeder Dies

Luther H. Schroeder, vice president and treasurer of the Sherwin-Williams Co., died following a heart attack. A native Clevelander, he was 69 at the time of his death.

Mr. Schroeder joined Sherwin-Williams in 1908 as a junior clerk. While serving in a number of financial and administrative positions with the company he studied law at Cleveland Law School. He received his legal degree and was admitted to the Ohio Bar in 1914.

In 1922, Mr. Schroeder was named treasurer of the company. He was only the second treasurer Sherwin-Williams has had in its 94 years of existence. His predecessor in the post was Sereno P. Fenn. Mr. Schroeder became a director of the company in 1926 and was elected a vice president in 1943.

Nuodex Appoints Asher-Moore

Asher-Moore Co., Richmond, Va., has been appointed by Nuodex Products Co., a division of Heyden Newport Chemical Corp., Elizabeth, N. J., to serve as the Nuodex agent to the protective coatings industry in the state of Virginia.

Asher-Moore, will handle the complete line of paint additives which include driers, fungicides, bodying agents, mixing and milling aids, loss of dry inhibitors, antifoam agents and anti-skinning agents.

New Company Formed

A new company manufacturing paint dispersing machines has been formed in Fort Wayne, Ind. The company, the Shar Dispersion Equipment Co., Inc., will make machines in three sizes—laboratory model, 10 hp., and 20 hp. Officers of the company are Lawrence A. Schmitt, Jr., president; Harold Hoffman, vice president; Willard H. Hart, secretary; and Richard Rigel, treasurer.

According to Mr. Schmitt, Shar dispersers feature a unique impeller, patent pending, designed to eliminate air pockets, give greater shearing value, and lessen dispersion time. The machines are hydraulically operated and do not require compressed air. He said the company will make machinery to order in addition to manufacturing the three standard sizes.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

WANTED TO PURCHASE

Wish to purchase paint brush manufacturing equipment in good condition. Box 1060.

PERSONNEL CHANGES

CONTINENTAL CAN

James K. Cooper has been appointed District Sales Manager for metal cans in Atlanta, Ga.

P. N. Smith succeeds Mr. Cooper as Product Sales Manager in New York. Mr. Smith had previously been an assistant product sales manager in the Industrial and Household Products group, responsible for cans that package aerosol products, anti-freeze, motor oil, hydraulic fluids and jet oils.

WITCO CHEMICAL

New assignments for **Richard H. Dorsett** and **Robert Stevenson** of the Southwestern Sales Staff have been announced.

Mr. Dorsett, formerly with the Organic Chemicals Division's sales force in Dallas, Tex., has been appointed Southwestern Sales Manager, with headquarters in Houston, Tex. The southwestern sales territory includes Texas, Oklahoma, Louisiana, Arkansas and Mississippi.

Mr. Stevenson has been transferred from Houston to Dallas.

GENERAL ELECTRIC

G. Stephen Glaser has been appointed sales representative of the Eastern District of the Silicone Products Department. His office location will be in Newark, N. J.

GLIDDEN

Carroll O. Hutchinson has been named Market Development Manager.

Mr. Hutchinson will head the division's newly-created Market Development Department which will serve to place present and future industrial paint and allied products in new market areas, and to strengthen their existing position in those markets.

C. O. Hutchinson

R. W. Quarles

UNION CARBIDE

Dr. R. W. Quarles has been named Manager of Patents and Licenses.

In his new position, Dr. Quarles will be responsible for the administration of the patent program, including the licensing and use of patents. He will also be in charge of the program for the procurement of licenses.

DUPONT

Richard D. Hedreen has been promoted to Director of Sales of the firm's Explosives Department.

Samuel E. Walker, who has been Production Manager of the Explosives Section, was appointed Assistant Director of Sales for Explosives Products to succeed Mr. Hedreen.

Tom T. Brown, Manager of the Chemical Sales Section, was named Sales Service Manager. He was succeeded by **Henry H. Herring,** who has been Director of the Sales Development Laboratory.

Marshall F. Acken, who has been Manager of the Sales Development Section, was transferred to the newly reorganized Research and Development Division as manager of Market Studies. **Robert E. Lunn,** Sales Service Manager, was appointed Production Manager of the Explosives Section.

FOY PAINT

Edward A. Foy, formerly Executive Vice-President, was elected President of the firm at a special meeting of the Board of Directors.

James J. Foy, was elected Vice-President — Operations. Formerly charged with paint production responsibilities, Mr. Foy will assume the overall responsibility for all the company's manufacturing operations and all its physical assets.

Other officers of the firm are Geo. W. Schneider III, Vice-President-Secretary, and Chas. W. Heitman, Treasurer.

Federation of Societies for Paint Technology

YE OLDE PAINT STONE 1737

Constituent Society Meetings

Baltimore, 2nd Friday, Marty's, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Dick Perfidio's Wishing Well.
Dayton — Nov., Feb., April, Hotel Gibbons.
Columbus — Jan., June, Sept., Everglades.

Cleveland, 3rd Friday, Cleveland Engineering & Scientific Center.

Dallas, 1st Thursday after 2nd Tuesday, Lucas B & B.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Monday before 3rd Wednesday, Sabella's Restaurant, San Francisco.

Houston, Monday prior to 2nd Tuesday, Rams Club.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Montebello Country Club.

Louisville, 3rd Wednesday, Sheraton Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 2nd Thursday, Philadelphia Rifle Club.

Piedmont, 3rd Wednesday, Rainbow Supper Club, High Point, N. C.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Monday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Rugger's.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-8 Club, Buffalo.

CALENDAR

October 6-7. National Assn. of Corrosion Engineers, Western Conference, San Francisco, Calif.

October 6-8. National Assn. of Corrosion Engineers, Southeast Conference, Atlanta, Ga.

October 6-8. Southern Paint Dealers Assn., Annual Convention and Exhibit, Robert Meyer and George Washington Hotels, Jacksonville, Fla.

October 11-14. National Assn. of Corrosion Engineers, Northeast Conference, Huntington, West Va.

October 17-18. American Coke and Chemicals Institute, Annual Meeting, Greenbrier, White Sulphur Springs, West Va.

October 17-19. American Oil Chemists' Society, Fall Meeting, Hotel New Yorker, N. Y.

October 19-20. National Assn. of Corrosion Engineers, North Central Conference, Milwaukee, Wis.

October 20-22. National Paint Salesmen's Assn., Annual Convention, Wiklard Hotel, Washington, D. C.

October 25-27. National Assn. of Corrosion Engineers, South Central Conference, Tulsa, Okla.

October 27-29. National Paint, Varnish & Lacquer Assn., 73rd Annual Meeting, Drake Hotel, Chicago, Ill.

October 29-Nov. 2. Federation of Societies for Paint Technology and 25th Paint Industries Show, 38th Annual Meeting, Sherman Hotel, Chicago, Ill.

October 31. American Management Assn., Packaging Management Course, Hotel Astor, New York City.

December 3-9. Chemical Specialties Manufacturers Assn., 47th Annual Meeting, Hollywood Beach Hotel, Hollywood, Fla.

1961

February 23. Protective Coatings Div. of the Chemical Institute of Canada, Divisional Conference, Toronto, Ontario.

February 24. Protective Coatings Div. of the Chemical Institute of Canada, Divisional Conference, Montreal, Quebec.

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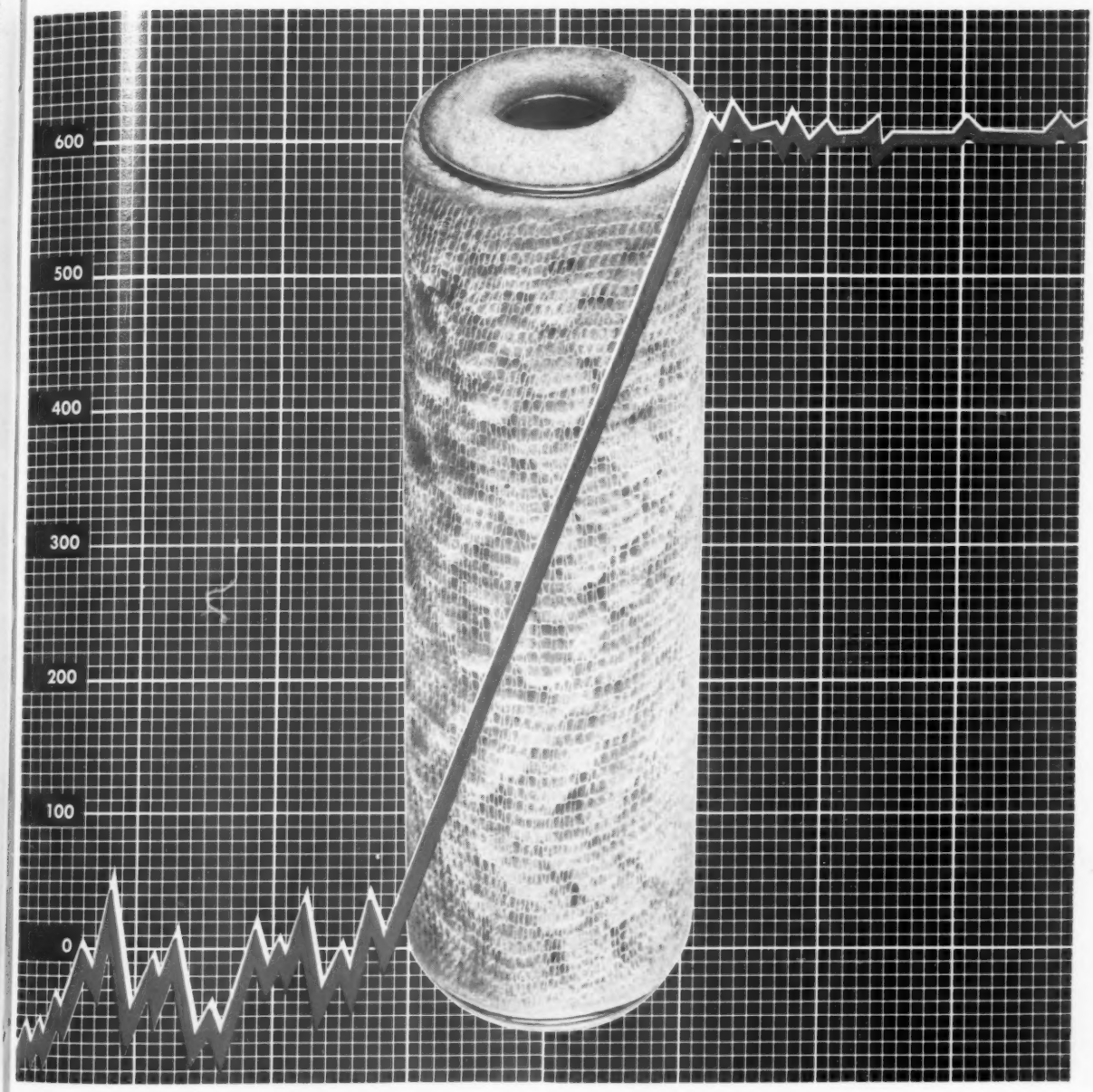

Performance records climb with new AFCO "Feutron"® cartridge!

This sensational *new* filter cartridge will out-perform your present cartridges. An exclusive construction plus precision-controlled materials make the important difference.

The AFCO "Feutron" cartridge is manufactured from all-new, custom-engineered fibers of consistent denier, to a controlled, *consistent* density and texture. This means top efficiency, performance economy and uniform particle retention in filtering impurities from all types of liquids and gases.

Faster flow . . . higher solids capacity . . . and dependable uniformity in the filtrate will send your filter performance records soaring above previous norms.

We can supply AFCO "Feutron" filter cartridges to fit your present equipment exactly. A letter from you will bring full technical information by return mail.

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OVER 60 YEARS OF FILTRATION EXPERIENCE

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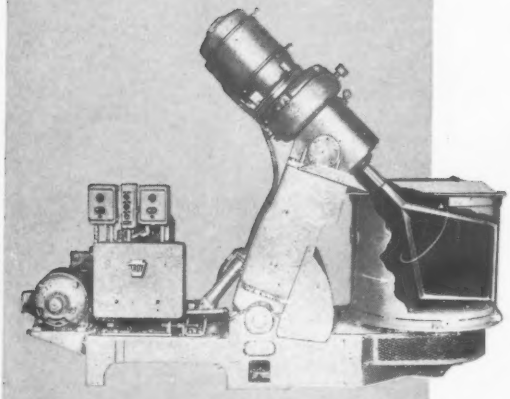

ANGULAR MIXER
60-Gallon size illustrated

"Seeing Is Believing"

Take the first available opportunity* to see a Troy mixer at work. Note how the rugged construction of the machine backs up the forceful mixing action. When you observe the action illustrated above in a batch of material, the term "mixing action" comes alive, it has meaning.

You will also see how the side and bottom surfaces of the tank are used by the agitator for its hard-working kneading and mulling action and how the material thus worked is spread and distributed in a continuous and continuing manner throughout the multi-directional path the action generates.

Then, examine the mix . . . the sides of the can . . . the bottom. High quality mixing is the basis for consistently producing high quality product with minimum effort.

**Our representative will be happy to arrange this.*

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